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NATURAL HISTORY

THE GLOBE, OF MAN, OF BEASTS, BIRDS, FISHES,
REPTILES, INSECTS AND PLANTS.

FROM

THE WRITINGS OF BUFFON, CUVIER AND OTHER
EMINENT NATURALISTS.

A NEW EDITION,

WITH MODERN IMPROVEMENTS, AND FIVE HUNDRED
ENGRAVINGS.

BOSTON:
GRAY AND BOWEN.
MDCCCXXXI.

A

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OF

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IN FIVE VOLUMES.

VOL. I.

BOSTON:
PUBLISHED BY GRAY AND BOWEN.

1831.

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1853 June 13
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BOSTON PRESS...WATER STREET.

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CONTENTS OF VOL. I.

CHAP. I.

Of Attraction—Repulsion—Elements—Heat—Air—Water—Earth—Metals and Mines—the Form, Composition, &c. of the Earth—Fossil Remains. . . . . p. 1

CHAP. II.

Of Mountains—Precipices—Clefts, or Caverns—Rivers—the Nile—Cataracts—Subterraneous Rivers—Saltness of the Sea—of different Seas—of Lakes—their Nature and Properties. 42

CHAP. III.

Of Winds, regular and irregular—Monsoons—Hurricanes—Whirlwinds—Waterspouts. 64

CHAP. IV.

Of Volcanoes—Earthquakes—the Formation of new Islands—Caves and Grottoes—Bogs and Fens—Mutations of Land into Sea, &c. 84

CHAP. V.

Of the Nature of Man—Of Infancy—Manhood—Extent of Human Life—Of the Senses—Anecdotes illustrative of this Subject. 114

CHAP. VI.

Of the apparent Varieties of the Human Species—Laplanders—Tartars—Chinese—Javanese—Formosans—Moguls—Persians—Arabians—Egyptians—Circassians—Turks—Russians—Negroes—Hottentots—Americans—Causes of this Variety—Accidental Varieties—White and Pied Negroes—Albinos—The Porcupine Man—Curious Child—Negro that from Black became White—Dwarfs—Curious Wedding—History of Baby—Giants—Narrative of extraordinary Twins—Siamese Youths. 148

CHAP. VII.

Of Quadrupeds in general—Of domestic Animals—The Horse—The Ass—The Ox—The Sheep—The Goat—The Swine—Of the Wild Boar, &c. 198

CHAP. VIII.

Of another Class of domestic Animals—The Dog—Its Varieties—Of the Cat, &c. 261

CHAP. IX.

Of certain intermediate Animals between wild and domestic—The Stag, or Red Deer—Of the Fallow-deer, the Roebuck, &c. 302

CHAP. X.

Of wild Animals—The Hare—The Alpine Hare—The Ogotona Hare—The Calling Hare—The American Hare—The Little Chief Hare—and the Rabbit. 316

CHAP. XI.

Of carnivorous Animals—The Wolf—American Wolves—American Foxes—The Badger—The American Badger—The Otter—The Sea Otter—The Mink—The Martin—The Pine Martin—The Pole Cat—The Skunk—The Ferret—The Weasel—The Ermine—The Sable. 331

CHAP. XII.

Of certain smaller Animals of the carnivorous Class—The Squirrel—The Rat—The Brown Rat—The Water Rat—The Mouse—The Long-tailed Field Mouse—The Short-tailed Field Mouse—The Shrew Mouse—The Water Shrew Mouse—The Bat—The Fat Squirrel—The Garden Squirrel, or Great Dormouse—The Common Dormouse—The Guinea Pig—The Mole—The Hedgehog—The Marmot. . 378

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NATURAL HISTORY.

PART I.

CHAPTER I.

Of Attraction.....Repulsion.....Elements....Heat....Air.....Water....Earth....Metals and Mines....the Form, Composition, &c. of the Earth....Fossil Remains.

The known powers of nature may be reduced to two primitive forces, *attraction* and *repulsion*. The first is the cause of gravity; in other words, it is by the attraction which exists between the mass of earth, and all bodies near its surface, that every thing has a natural tendency downward, that all matters fall to the ground, &c. The second principle is the cause of elasticity, and, by counteracting the effects of attraction, prevents the matter of the universe from becoming a solid mass.

The most ancient authors have agreed in supposing, and mankind in general still imagine, that there are only four distinct species of elementary or original matter, *viz.* fire, air, water, and earth. Modern science has, however, discovered that none of these are entitled to be considered as elements, or primary substances; while, on the other hand, it has increased the number of elementary principles to fifty-two. But as the popular arrangement is sufficient for our present purpose, we will not depart from it.

There is reason to believe that FIRE, HEAT, or CALORIC, is the only permanently elastic substance in nature. We see that when it penetrates the pores of any body, it uniformly expands it. A bar of iron is lengthened by being heated, metals and other substances are melted by it, and water is converted into vapour. There is therefore ample ground for believing that all fluidity is the effect of heat. The natural state of water is ice; and air itself, were there any means of producing a sufficient degree of cold, might probably be reduced to a solid mass.

As all fluidity has heat for its cause, we find, by comparing certain substances together, that much more heat is requisite to keep iron in fusion than gold, much more to keep gold in that state than tin, much less to keep wax, much less to keep water, much less for spirit of wine, and at last exceedingly less for mercury (quicksilver); since it only becomes solid at 187 degrees below that point at which water freezes; this matter, mercury, would be therefore the most fluid of all bodies, if air were not still more so. Now, what does this fluidity greater in air, than in any other matter, indicate? It appears to indicate the least degree of adherence, that can be conceived, between its constituting parts, by supposing them of such a figure as only to touch each other at one point. The greater or less degree of fluidity does not, however, indicate that the parts of the fluid are more or less weighty, but only that their adherence is so much the less, their union so much the less intimate, and their separation so much the easier. If a thousand degrees of heat are required to keep water fluid, it, perhaps, will only require one to preserve the fluidity of air.

It is doubtful whether LIGHT consists of the same matter with elementary fire or not. The great source of light is found to be the sun, from whose body it is projected in the space of nearly eight minutes; and as the sun is computed to be distant ninety-five millions of miles, the light must of consequence travel at the rate of about two hundred thousand miles in one second of time.

Light may be reflected as well as projected. The light which we receive from the moon is only reflected as from a mirror. The light of the sun is three hundred thousand times stronger than the light of the moon. Whether the solar rays themselves convey heat, or act by evolving the caloric of bodies, is a point which is yet undecided.

The air we breathe is a compound of two gases, oxygen and nitrogen, in the proportion of twenty-one of the former to seventy-nine of the latter. It also contains vapour, and small quantities of carbonic and other gases. For a considerable period oxygen was supposed to be the only supporter of combustion; but it is now known that it is not the sole supporter.

"It is vulgarly supposed," says Buffon, "that flame is the hottest part of fire, yet nothing is worse founded than this opinion; for the contrary may be demonstrated by the easiest and most familiar experiments. Offer to a straw fire, or even to the flame of a lighted faggot, a cloth to dry or heat, double and treble the time will be required to give it the degree of dryness or heat, that would be given to it by exposing it to a brazier without flame, or even to a very small heat. Flame has been characterized, by Newton, as a burning smoke; and this smoke, or vapour, which burns, has never the same quantity, the same intensity of heat, as the combustible body from which it escapes. Only by being carried upwards, and extending itself, it has the property of communicating fire, and of carrying it further than the heat of the brazier does, which alone might not be sufficient to communicate it when even very near." Buffon's assertion, however, is disproved by modern discoveries, which show that the temperature of flame is superior to that of iron heated to a white heat. An iron wire may be rendered white hot by being held nearly in contact with the flame of a spirit lamp. Flame is gaseous matter in a state of ignition. In some instances at least, flame is ignited only at its outer surface. The flame of a candle, for example, is a hollow cone.

Air is not only perceptible to the touch, but is also found by experiment to have weight; a bottle emptied of its air is much lighter than before, and by computations founded on this experiment, it is known that a cubic foot of air weighs five hundred and twenty-seven grains. A cubic foot of hydrogen weighs no more than forty grains; and the difference of gravity between this gas and the atmospheric fluid is the cause of the ascent of balloons. The spring of air is shown in many easy experiments. A blown bladder, for instance, if pressed down, returns to its shape as soon as the pressure is removed. It is evident that, as the air is possessed of weight, the air of our atmosphere must press considerably upon the earth, and all the bodies which are upon it. Thus, if our hand be placed upon a tube, or air pump, which is emptied of its air, we shall find that it so forcibly adheres, as it were by suction, to the mouth of the tube or pump, that we can scarcely withdraw it. This is however nothing else than the weight of a column of air, the breadth of the hand, which presses upon it, and keeps it down. In the same manner, if the air be exhausted out of a tube, one end of which is immersed in water, the weight of the atmosphere pressing upon the surface of the water will force the water up the empty tube to the height of about thirty-four feet; and if the tube be immersed in quicksilver, it will force the quicksilver up to the height of twenty-nine inches and a half. A column of air, therefore, of the height of the atmosphere, which is about forty-five miles, is equal in weight to thirty-four feet of water, and about thirty inches of quicksilver.* From these experiments it is computed that a man usually sustains a weight of air of about thirty-two thousand four hundred pounds: a weight sufficient to crush him to atoms, were it not balanced by the outward pressure of the air enclosed in his frame.

Like all other matters, air is expanded by an increase of caloric, or the matter of fire or heat, introduced between its particles. It is therefore said to be rarefied by being heated. The greatest degree of cold that ever has been known, is not sufficient to destroy the spring of air. Air has, however, been reduced to the state of a liquid, by a degree of pressure equal to one thousand two hundred atmospheres. As the particles of air are subject to the laws of gravitation, air is likewise expanded or rarefied by a decrease of its mass or quantity; for instance, if a quantity of the superior air be removed, the pressure on that below is proportionably decreased, and from its inherent elasticity, it is rarefied, or the particles removed to a greater distance from each other. Thus also the receiver of an airpump, after a çonsiderable quantity of the air is pumped out, still continues in reality full of air, though that air is of a thinner consistency.

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* On this principle the barometer is constructed, in order to show the variations in the weight of the air. When it is light the quicksilver in the glass is less pressed by the atmosphere, and when the air is dense and heavy the quicksilver rises. Barometers are also used to determine the height of mountains, &c. because the higher we ascend in the atmosphere the less is the weight which presses on the quicksilver.

Air not only contributes to combustion, but also to animal and vital heat. Animals, which have lungs, and which, consequently, respire air, have always more heat than those which are deprived of it; and the more the internal surface of the lungs is extended and ramified in a greater number of cells, the more, in one word, it presents a greater surface to the air which the animal draws in by inspiration, the more also its blood is heated, and the more it communicates heat to all the parts of the body it nourishes; and this proportion takes place in all known animals. Birds, relatively to the volume of their body, have lungs considerably more extended than man or quadrupeds. Reptiles, even those which have a voice, as frogs, have instead of lungs a simple bladder. Insects which have little or no blood, pump the air only by some pipes, and these have little animal heat. Thus, taking the degree of the temperature of the earth for the term of comparison, "I have observed," says Buffon, "that this heat being supposed ten degrees, that of birds is nearly thirty-three, that of some quadrupeds more than thirty-one and a half, that of a man thirty and a half, or thirty-one; whereas, that of frogs is only fifteen or sixteen, that of fishes and insects eleven or twelve; that is, the least of all, and very nearly the same as that of vegetables. Thus the degree of heat in man and animals, depends on the force and extent of the lungs: these are the bellows of the animal machine; they support and augment the fire according as they are more or less powerful, and their motion more or less ready."

Vegetables and most insects have, in the room of lungs, only aspiratory tubes or pipes, a kind of tracheas or windpipes, by which they pump up the air which is necessary for them; it is seen to pass in very sensible balls into the pith of the vine; it is not only pumped up by the roots, but often even by the leaves; it forms a part, and a very essential part, of the food of the vegetable, which assimilates, fixes, and preserves it.

WATER is a compound, formed of two gases, oxygen and hydrogen, in the proportion of eighty-nine parts of oxygen and eleven parts of hydrogen. It has already been intimated, that heat is the efficient cause of all fluidity, and that ice therefore may be termed the natural state of *water:* by adding to the quantity of heat, water is rendered elastic and volatile; that is, it is converted into an invisible vapour called steam, which is again condensed into water, when the superfluous heat is withdrawn. The force of vapour is almost incredible. Under certain circumstances, it may exceed thirty times that of gunpowder. An insignificant portion of water converted into steam will raise enormous weights, and if not properly regulated, will burst the most solid metallic vessels. The wonderful power and boundless utility of this agent are strikingly exemplified in the steam engine.

One property of water it is necessary to notice, and that is, that it will always rise to the level of its source, when conveyed in pipes, or other close channels. This property is owing to the pressure of the atmosphere, which pressing equally on all parts, will force the fluid from the source, through whatever channels it is to pass, till it meets with an equal resistance from the pressure of the atmosphere at the other end. This is the principle on which fountains and jets-d'eau are constructed. The water which is spout-ed out by the fountain is always conveyed in a pipe from some source which lies higher than the mouth of the fountain.

When the pressure of the atmosphere is removed from the mouth of a pipe or tube, water will rise in it to the height of thirty-three feet above the height of its source. This is owing to the pressure of the atmosphere upon the source of the water; and on this principle the common pumps are constructed, a vacuum being created by the raising of the piston of the pump.

All bodies lighter than water swim in that element, bodies which are heavier are capable of displacing a bulk of water equal to their own, and consequently sink. Ice (which is water in a solid state) floats upon water, from its being porous. For the same reason water, in freezing, bursts the closed vessels in which it is contained: as it is more porous than water, it necessarily takes up more room. So strong is the expansive power of water in freezing, that a single cubic inch expands with a force equal to thirteen tons. Cannon, of an inch thick, and bomb shells, of an inch and three-quarters, have been split by this means. The dilatation of water, in passing to the state of ice, affords a beautiful instance of the wisdom of Providence. Had water, like every other substance, been contracted while cooling, the first coat of ice would have sunk to the bottom, another would have been formed and precipitated in the same manner, and thus the process of freezing and sinking would have continued till the whole of the aqueous fluid on the globe was rendered a solid mass.

Water constitutes, if not the principal, at least, a considerable part of the food of vegetables. It is the medium by which a certain class of animals, on this account termed aquatic, respire; its utility to man, as well in diluting his food, as in increasing his enjoyments in various modes, it would be tedious and useless to describe minutely. A quantity of air is generally contained in water.*

Though the arrangement will not be a strictly scientific one, the other matters of which this universe, at least that part of it which is visible to us, is composed, may be reduced to three classes. 1st. Those which are purely combustible, such as all animal and vegetable matters:

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* As water is frequently mixed with foreign matter, and is often the repository of minute animals, or vegetable seeds, we need not be surprised that, when carried to sea, it is always found to putrefy. But we must not suppose that it is the element itself, which thus grows putrid and offensive, but the substances with which it is impregnated. It is true, the utmost precautions are taken to destroy, by boiling, all vegetable and animal substances, that may have previously been lodged in it: but, notwithstanding this, there are some that will still survive the operation; and others, that find their way during the time of its stowage. Seamen, therefore, assure us, that their water is generally found to putrefy twice, at least, and sometimes three times, in a long voyage. In about a month after it has been at sea, when the bung is taken out of the cask, it sends up a noisome and dangerous vapour, which would take fire upon the application of a candle. The whole body of the water then is found replete with little worm-like insects, that float, with great briskness, through all its parts. These generally live for about a couple of days; and then dying, by depositing their spoils, for a while increase the putrefaction. After a time, the heavier parts of these sinking to the bottom, the lighter float, in a scum, at the top; and this is what the mariners call, the water's purging itself. There are still, however, another race of insects, which are bred, very probably, from the spoils of the former, and produce, after some time, similar appearances; these dying, the water is then thought to change no more. However, it very often happens, especially in hot climates, that nothing can drive these nauseous insects from the ship's store of water. They often increase to a very disagreeable and frightful size so as to deter the mariner, though parching with thirst, from tasting that cup which they have contaminated.

2dly. Those which may be reduced to a calx or cinder, such as most of the metals: 3dly. Those on which fire appears to have no effect, and produces no alteration of weight, such as the precious metals, gold for instance.

Another division was at one time adopted by chemists, who divided all uninflammable matters into the vitrifiable, or that which is convertible into glass; and the calcareous, or that which is convertible into lime.

Thus crystals, precious stones, free-stone, granites, porphyries, agates, gypsums, lava, pumice-stone, with all metals and other minerals, are vitrifiable either by the fire of our furnaces, or that of burning mirrors; whereas marble, alabaster, chalk, marl, and other substances which proceed from the waste shells and madrepores, cannot be brought into fusion by these means. Many substances however, which were formerly considered as infusible, have recently been reduced by the agency of the galvanic fluid, or by the oxy-hydrogen blowpipe.

Of all the substances which are found upon the earth, or within its bowels, those from which the METALS are formed are the most curious. It is almost unnecessary to state, that they exist in the mine in a form very different from that which they assume, when they have been melted in the furnace, and polished by the art of man. In their original state they are called ores, and the metal is then mixed with earthly particles and other matters, which are expelled by fire. The most precious metals, as gold and silver, do not form the most splendid ores. The *pyrites*, which are a mixture of iron and sulphur, are much more beautiful to the eye.

The trade of a miner is the most wretched and most dangerous of all. They are not only exposed to the common accidents of the roof falling in or a sudden overflow of water, but also to a variety of *damps*, as they are called, or noxious vapours, which are fatal to human life. Of these there are two principal kinds, the *fire damp*, *inflammable air*, or *light carburetted hydrogen gas*, which will take fire and explode like gunpowder by the contact of flame: the other is the *choak damp*, *fixed air*, or *carbonic acid gas*, which kills immediately when taken into the lungs. The former of these is the most frequently and extensively destructive: more than a hundred miners have at once fallen victims to it. Sir Humphrey Davy has, however, deprived it of part of its terrific influence by his discovery of the safety lamp. Even the light and volatile parts of the minerals themselves, and especially arsenic, with which all mines abound, are imbibed by the unfortunate workmen, and rapidly effect their destruction. On this account, coal mines are generally less noxious than those of tin; tin than those of copper or lead; but none are so dreadfully destructive as those of quicksilver. At the mines near Idria, in the Austrian dominions, nothing can adequately describe the deplorable infirmities of such as fill the hospital there: emaciated and crippled, every limb is contracted or convulsed, and some in a manner transpire quicksilver at every pore. "There was one man (says Dr. Pope) who was not in the mines above half a year, and yet whose body was so impregnated with this mineral, that putting a piece of brass money in his mouth, or rubbing it between his fingers, it immediately became as white as if it had been washed over with quicksilver. In this manner all the workmen are killed, sooner or later; first becoming paralytic, and then dying consumptive: and all this they sustain for the trifling reward of seven-pence a day." A terrific catastrophe occurred in the mine of Idria, in the year 1803. On the night of the 15th of March, a thick smoke arose from the lower galleries, and spread itself through the higher. Though no fire was visible or audible, it was evident that the mine was burning below. Some of the most intrepid of the workmen endeavoured to reach the scene of the conflagration; but their efforts were fruitless, and they were compelled to retreat from one gallery to another before their invisible enemy; for the ascending smoke was not merely so dense and suffocating, but so loaded with noxious fumes from the minerals, that no living creature could encounter it with safety. Having saved themselves above ground, they strove to extinguish the fire by excluding the air, and all the shafts and passages were accordingly stopped up. This, too, was unavailing. Twice, in the course of five weeks, the shafts were opened, and each time the enemy was found to be more violent than ever. The flames were heard raging below with a sound at which the miner still trembles when he relates it; the smoke, burdened with mercurial and sulphurous exhalations, rolled forth from the mouth of the pit, like streams from the jaws of Acheron, striking down every one that came within its reach. As a last resource, it was resolved to lay the mine under water. A stream was allowed to flow down the shaft for two days and three nights. No effect was produced during the first day. In the course of the second, either from the steam produced, or from inflammable air, a subterraneous explosion shook the mountain with the noise and violence of an earthquake. The huts of the miners, situated near the entrance, were rent; houses farther off, but standing on the slope or near the skirts of the hill, started from their foundations; and the panic-struck inhabitants fled in dismay from the ruin that seemed to threaten their valley. In the mine itself, the explosion rent the galleries, threw down the arched roofs, and tore up the stairs. But the victory was gained; the vapours began to diminish, and at the end of some weeks it was possible to venture into the mine. To pump out the water was the labour of two years. It was carried off into the Idria, and was found to contain only a small quantity of mercury, but a large proportion of vitriolic acid, and so much iron, that the bed and bank of the river were encrusted with iron ochre throughout its whole course, from Idria to its confluence with the Lisonzo. At the same time every fish disappeared from the stream except the eel, which seems to bid defiance to every thing except actual broiling or roasting. Even when the galleries had been cleared of the water, it was impossible to work in them, partly from the heat which they still retained, but still more from the fumes of the sublimated mercury, which produced in the miners a violent salivation, accompanied with convulsions and trembling of the limbs. To produce an almost inhuman zeal, high wages were offered to such as would venture into places reckoned the most dangerous, to explore the consequence of the disaster, and collect the quicksilver which had been deposited in large quantities in the galleries. Many purchased this additional pittance with their lives; and the atmosphere, which continued for months to infect the mine, was so baneful, that it was difficult to muster a sufficient number of healthy men for ordinary operations.

A still more striking instance of the volatility, penetrating power, and noxiousness of mecurial vapours was afforded, in 1810, on board the Triumph man of war. This vessel had taken on board thirty tons of quicksilver, contained in leather bags of fifty pounds each, which had been picked up on the shore of Cadiz, from the wreck of two Spanish ships. The bags were stowed in the bread room, after hold, and store rooms. Being saturated with salt water, in about a fortnight they all decayed and burst. In collecting the quicksilver, to save it in casks, much of it found its way into the unapproachable recesses of the ship, and some was secreted by the men, who amused themselves with it in various ways. At this period so much bilge-water had collected in the ship that the stench was intolerable, and the carpenter's mate was nearly suffocated by the effluvia while sounding the well. The effect of the gas evolved from bilge-water is manifested by its changing to black any metallic substance. In this instance, however, metals of every kind were coated with quicksilver; and a general affection of the mouth took place among the men and officers, to a severe degree of salivation, in upwards of two hundred men. It was, in consequence, necessary to take the Triumph into dock, remove all her stores, clean her hold thoroughly, and dislodge one of her lowest planks, in order to make an opening for the escape of the mercury, before she could be restored to a serviceable state.

The surface of this globe is divided, from one pole to the other, by two immense bands of earth, and two of water. The first and principal of these portions of earth is that which is called the ancient continent, and which includes Europe, Asia, and Africa. This continent, if measured from the sea of Anadyr to the Cape of Good Hope, will produce a line of 2960 marine leagues, which will form with the equator an angle of sixty-five degrees; and if measured according to the meridian, that is directly from north to south, we shall find that there are only 2500 leagues from the northern Cape of Lapland to the southernmost point of the Cape of Good Hope. The utmost breadth of this continent, from the western coast of Africa, to the east coast of China, is about 2800 leagues. Another line may be drawn also from Brest in Brittany, as far as the coast of Chinese Tartary, to the extent of 2300 leagues. The old continent, on the best calculations, may be said to contain 4,940,780 square leagues, which is about a fifth part of the surface of the globe.

The new continent, so called because more recently discovered, goes under the general name of America, and is divided into north and south. The longest line which can be traced on it, may be estimated from the mouth of the river Plata, in Paraguay, to the Arctic ocean, in latitude seventy degrees, which amounts to about 2300 leagues. Its whole extent, however, from Icy Cape to Cape Horn, is more than 3000 leagues. The new continent is supposed to contain 2,140,212 square leagues. The whole superficial contents, therefore, of both the old and new continents, are about 7,080,993 square leagues; not near a third of the surface of the globe, which contains 25,000,000 square leagues.

The ancients were acquainted with but a small part of the globe. All America, Australasia, Polynesia, and a great part of the internal regions of Africa, were entirely unknown to them. They only knew that the torrid zone was inhabited, although they had navigated round Africa; for about 2200 years ago, the king of Egypt gave vessels to the Phenicians, who departed in them from the Red Sea, coasted round Africa, doubled the Cape of Good Hope, and having employed two years in this voyage, entered the straits of Gibraltar in the third year.* Nevertheless, the ancients were not acquainted with the property which the loadstone has, of turning towards the poles, although they knew that it attracted iron. They were ignorant of the general cause of the flux and reflux of the sea; they were not certain that the ocean surrounded the globe without interruption; some indeed suspected it, but with so little foundation, that no one dared to say, or even conjecture, that it was possible to make a voyage round the world. Magellan, or rather Cano, for Magellan was slain at Zebu, was the first who made it, A. D. 1519, in twelve hundred and twenty-four days. Drake was the second, in 1577, and he accomplished it in one thousand and fifty-six days; Thomas Cavendish afterwards performed this great voyage in seven hundred and seventy-seven days, in the year 1586. These famous travellers were the first who demonstrated, physically, the globular form and the extent of the earth's circumference; for the ancients were far from having a just measure of this circumference. The general and regulated winds, and the use to be made of them in long voyages, were also absolutely unknown to them; we must therefore not be surprised at the little progress they made in geography; since at present, in spite of all the knowledge we have acquired by the aid of the mathematical sciences, and the discoveries of navigators, many things remain still to be found, and vast countries to be discovered.

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* See Herod. lib. iv.

An area of 145,600,000 square English miles, being nearly three-fourths of the surface of the globe, is occupied by the ocean and its inland seas and bays. Of this mighty mass of waters, about seven-twelfths lie in the southern hemisphere, and five-twelfths in the northern. In the one, the proportion of ocean to land is nearly as seven to five; in the other, it is as thirteen to two. The depth of the ocean we have no means of estimating with perfect accuracy. In some places it is certainly immense. From data furnished by the calculations of Laplace, the mean depth has been taken at two miles, which gives 290,000,000 of cubic miles for the cubic contents.

The FORM OF THE EARTH is not that of a perfect globe, but rather what is termed an oblate spheroid, a globe which is flattish at the poles; the axis, therefore, or line which may be supposed to pass through it at the equator, is to its axis at the poles in the proportion of two hundred and thirty to two hundred and twenty-nine. The solid parts of the earth are formed of beds or strata* of different materials, which lie one upon another in a regular order. The first stratum or layer consists of mould, or common soil, mixed with a variety of decayed vegetable and animal matters, and with stony and sandy particles. In different parts of the world the other strata are found to consist of different materials, and differently disposed. In some parts the strata are horizontal, in others they are inclined; and veins or fissures of metals, coals, and other minerals, frequently penetrate through the different beds of strata to a great depth, and divide them. At Marly-la-Ville in France, the following strata were found. It is a high country, but flat and fertile. The strata were here arranged horizontally. From the shells which were found in Nos. 16, and 21 to 25, we may conjecture, not only that at some period the soil of Marly-la-Ville was at the bottom of the sea, but that it has twice been so at epochs distant from each other, and that even the last must have been in remote ages, as a deposit of forty-six and a half feet in thickness has been formed on the upper stratum of shells.

The State of the different Beds of Earth found at Marly-la-Ville, at the Depth of One Hundred Feet.

	Feet.	Inch.
1. Reddish earth, mixed with much dirt, and a very small quantity of vitrifiable sand . . .	13	0
2. Earth mixed with gravel, and vitrifiable sand	2	6
3. Dirt mixed with much vitrifiable sand, which effervesced but little with aquafortis . . .	2	0
4. Hard marl, which made a very great effervescence with aquafortis	2	0
5. Pretty hard marly stone	4	0
6. Marl in powder, mixed with vitrifiable sand	5	0

* Layers, like the coats of an onion, or the leaves of a book.

	Feet.	Inch.
7. Very fine vitrifiable sand	1	6
8. Marl in earth, with a little vitrifiable sand	3	6
9. Hard marl, in which was real flint	3	6
10. Gravel, or powdered marl	1	0
11. Eglantine, a stone of the grain and hardness of marble, and sonorous	1	6
12. Marly gravel	1	6
13. Marble in hard stone, the grain very fine	1	6
14. Marl in stone, the grain not so fine	1	6
15. More grained and thicker marl	2	6
16. Very fine vitrifiable sand, mixed with sea fossil shells, which had no adherence with the sand, and whose colors were perfect	1	6
17. Very small gravel or fine marl powder	2	0
18. Marl in hard stone	3	6
19. Very large powdered marl	1	6
20. Hard and calcinable stone like marble	1	6
21. Gray and vitrifiable sand with fossil shells, particularly oysters and muscles, which had no adherence with sand, and were not petrified	3	0
22. White vitrifiable sand mixed with shells	2	0
23. Sand streaked red and white, vitrifiable and mixed with the like shells	1	0
24. Larger sand, but still vitrifiable, and mixed with the like shells	1	0
25. Gray, fine, and vitrifiable sand, with similar shells	8	6
26. Very fine fat sand, with a few shells	3	0
27. Freestone	3	0
28. Vitrifiable sand, streaked red and white	4	0
29. White vitrifiable sand	3	6
30. Reddish vitrifiable sand	15	0
Total depth when they left off digging	100	6

In a trench made at Amsterdam to make a pit, the earth was dry to the depth of two hundred and thirty feet, and the strata of earth were found as follows: seven feet of vegetable or garden earth, nine feet turf, nine feet soft clay, eight feet sand, four feet earth, ten feet sand, on which it is customary to fix the piles which support the houses of Amsterdam; then two feet argil or clay, four of white sand, five of dry earth, one of soft earth, fourteen of gravel, eight argil, mixed with earth; four of gravel, mixed with shells; then clay one hundred and two feet thick, and at last thirty-one feet sand, at which depth they ceased digging.

Every stratum, whether horizontal or inclined, has an equal thickness throughout its whole extent: that is, every bed of any matter whatever, taken separately, has an equal thickness throughout its whole extent; for example, when the bed of stone in a quarry is three feet thick in one part, it will have the same thickness throughout: if in one part it is found to be six feet thick, it will be so throughout. In the quarries about Paris the bed of good stone is not thick, scarcely more than eighteen or twenty feet; in other quarries, as those of Burgundy, the stone is much thicker. It is the same with marble; the black and white marble have a thicker bed; the coloured are commonly thinner, and there are beds of very hard stone, which the farmers in Burgundy make use of to cover their houses, that are not above an inch thick. In general it may be said, that the thickness of the horizontal strata is so greatly varied, that it is found from one line and less to one, ten, twenty, thirty, or one hundred feet thick; the ancient and modern quarries which are horizontally dug, and the perpendicular and other divisions of mountains, prove that there are extensive strata in all directions.

The progress of modern science has shown the ideas of Buffon, both with respect to the constituent materials of our globe and the arrangement of those materials, to be so erroneous, not to say absurd, that we must here desert him, and seek for other and safer guides to geological knowledge. The following outline of geology, from Mr. Maclaren's treatise in the Supplement to the Encyclopædia Britannica, and from Dr. Ure's excellent Dictionary of Chemistry, will give the general reader a sufficient insight into the subject.

"It would be foreign to our purpose," says Mr. Maclaren, "to enter into the disputes which divide geologists. Conceiving that the principles of geology, in the present day, are to be considered as little better than provisional, we shall recur to them as sparingly as possible. Of the central nucleus, as already stated, we can know nothing but by inference. The outer crust, however, lies exposed in part to our view, and the materials of which it is formed, so far as we are acquainted with them, consist of *four* great classes. 1. Those rocks which neither contain any animal nor vegetable remains themselves, nor are intermixed with rocks which do contain them, and are therefore termed primitive or *primary*, as having been formed before the existence of organized beings. These are granite, gneiss, mica slate, and clay slate, which occur abundantly in all regions of the globe, with quartz rock, serpentine, granular limestone, &c. which occur more sparingly. These rocks never contain organic remains, and, till lately, were supposed never to cover rocks containing them; but a larger experience has shown, that this does not hold true entirely, even of granite itself. (Daubuisson, II. 226.) 2. Rocks containing organic remains, or generally associated with other rocks in which such substances are found, and which, as having been formed posterior to the existence of organized beings, are termed *secondary*. These are gray wacke, sandstone, limestone, and gypsum of various kinds, slate clay, with certain species of trap, and they are found lying above the primary or older rocks. 3. Above these secondary rocks, beds of gravel, sand, earth, and moss are found, which have been termed *alluvial* rocks or *formations*. 4. The name of *volcanic formations* has been given to beds of lava, scoriæ, and other matter thrown out at certain points of the earth's surface by subterranean fire.

"A very distinct arrangement can be traced among these rocks, though they present a confused appearance to the eye on a first view. Where those of the primitive and secondary classes are exposed together, the granite, which generally exists in unstratified masses, is found almost invariably under all the others; and yet it also occupies the highest points of the earth's surface. The gneiss, which is merely a stratified granite, lies next it; then the mica slate, then the clay slate. The primary limestone, trap, serpentine, &c. lie in occasional beds intermixed with these. And above all the primary formations, are gray wacke, sandstone, and other secondary rocks. Farther, the primary rocks are in general highly crystalline in their structure; and at the points where they are exposed to view, are found standing on their edges, or inclining to the horizon, seldom at a less angle than forty-five degrees. The secondary rocks again have rather the appearance of mechanical deposits; they occupy a more horizontal position; and their upper edges, or *outgoings*, are generally found at a lower level than those of the primary class. On these facts, geologists have founded certain general conclusions. From the oblate spheroidal figure of the globe, and the arrangement of its mineral masses in beds or strata, they assume that the whole, or at least the outer crust, was at one time in a fluid state. That the central nucleus, of which we know nothing, is encompassed round and round by a coat or shell of granite, which, crystallizing from a fluid state by the force of a strong affinity, has assumed a very irregular figure, shooting up its elevated cones or ridges at some points, which form the naked summits of mountains, and sinking into vast cavities many miles, or dozens of miles, below the present surface, at others. That the gneiss, crystallizing next in order, was deposited above the granite, covering all the lower parts, but leaving the most elevated points of the granite bare. That the mica and clay slate were deposited in a less perfect state of crystallization above the gneiss, and in beds rather less inclined; that the older class of secondary rocks of a composition more mechanical than chemical, were then deposited above the mica and clay slate; the newer secondary rocks again upon the older, in a position approaching more and more to the horizontal, as their structure became less crystalline, and occupying a lower and lower level; so that the edges, or outgoings, of the older rocks are always found rising above one another, as you advance from low plains to the summit of mountains. It is thus supposed, that the gneiss and other stratified primary rocks are found in beds nearly vertical, because we see them only at those points where, resting on the elevated crests of the fundamental granite, they break through the secondary formations; but that, if we could penetrate through the masses of sandstone, limestone, &c. which cover them in level situations, we should find them there also, and lying in horizontal positions above the granite. Farther, we see how the deposition of the different formations brought the earth nearer and nearer to the state in which we find it. The deposition of the granite, we may suppose, left the surface divided into profound cavities bounded or broken by ridges or pinnacles with steep sides, on which few orders of animated beings would have existed. The stratified primary rocks, deposited on the bottom and sides of these cavities, filled them in part; the older secondary rocks, falling down in less inclined strata, reduced the inequality still farther; and the newer secondary rocks, subsiding mechanically in strata nearly horizontal, made the surface assume a tolerably even and regular appearance. Last of all, the masses of gravel, sand, earth, marl, and other alluvial matter, filling up the smaller crevices and hollows left by the newest rocks, smoothed the surface, and prepared the earth for the nourishment of vegetable substances, and the habitation of animated beings."

Such is an outline of the structure of the globe, according to the principles of Werner. The different mountain rocks are distributed by Werner into the following classes.

Class I. *Primitive Rocks.* 1. Granite. 2. Gneiss. 3. Mica slate. 4. Clay slate. 5. Primitive limestone. 6. Primitive trap. 7. Serpentine. 8. Porphyry. 9. Syenites. 10. Topaz rock. 11. Quartz rock. 12. Primitive flinty slate. 13. Primitive gypsum. 14. White stone.

Class II. *Transition Rocks.* 1. Transition limestone. 2. Transition trap. 3. Gray wacke. 4. Transition flinty slate. 5. Transition gypsum.

Class III. *Floetz Rocks.* 1. Old red sandstone, or first sandstone formation. 2. First or oldest floetz limestone. 3. First or oldest floetz gypsum. 4. Second or variegated sandstone formation. 5. Second floetz gypsum. 6. Second floetz limestone. 7. Third floetz limestone. 8. Rock salt formation. 9. Chalk formation. 10. Floetz trap formation. 11. Independent coal formation. 12. Newest floetz trap formation.

Class IV. *Alluvial Rocks.* 1. Peat. 2. Sand and gravel. 3. Loam. 4. Bog iron ore. 5. Nagelfluh. 6. Calc tuff. 7. Calc sinter.

CLASS V. *Volcanic Rocks.* *Pseudo volcanic rocks. 1. Burnt clay. 2. Porcelain jasper. 3. Earth slag. 4. Columnar clay iron stone. 5. Polier or polishing slate. **True volcanic rocks. 1. Ejected stones and lava. 2. Different kinds of lava. 3. The matter of muddy eruptions.

"The primitive rocks," says Dr. Ure, "lie under most, and never contain any traces of organized beings imbedded in them. The transition rocks contain comparatively few organic remains, and approach more nearly to the chemical structure of the primitive than to the mechanical of the secondary rocks. As these transition rocks were taken by Werner from among those which in his general arrangement were called secondary, the formation of that class made it necessary to abandon the latter term. To denote the mineral masses reposing on the transition series, he accordingly employed the term floetz rocks, from the idea that they were generally stratified in places nearly horizontal, while those of the older strata were inclined to the horizon at considerable angles. But this holds good in regard to the structure of those countries only which are comparatively low: in the Jura chain, and on the borders of the Alps and Pyrenees, Werner's floetz formations are highly inclined. Should we, therefore, persist in the use of this term, says Mr. Conybeare, we must prepare ourselves to speak of vertical beds of floetz (i. e. horizontal), limestone, &c. As the inquiries of geologists extended the knowledge of the various formations, Werner, or his disciples, found it necessary to subdivide the bulky class of floetz rocks into floetz and newest floetz, thus completing a fourfold enumeration. Some writers have bestowed the term *tertiary* on the newest floetz rocks of Werner. The following synoptical view of geological arrangement is given by the Rev. Mr. Conybeare.

Character.	Proposed Names.	Wernerian Names.	Other Writers.
1. Formations chiefly of *sand* and *clay*, above the chalk.	*Superior order.*	Newest floetz class.	Tertiary class.
2. Comprising, a. Chalk. b. Sands and clays. c. Calcareous freestones (*oolites*) and argillaceous beds. d. *New red sandstone, conglomerate, and magnesian limestone.*	*Supermedial order.*	Floetz class.	Secondary class.
3. Carboniferous rocks, comprising, a. *Coal measures.* b. *Carboniferous limestone.* c. *Old red sandstone.*	*Medial order.*	Sometimes referred to the preceding, sometimes to the succeeding class, by writers of these schools; very often the coal measures are referred to the former, the subjacent limestone and sandstone to the latter.	
4. *Roofing slate,* &c. &c.	*Submedial order.*	Transition class.	Intermediate class.
5. *Mica slate, gneiss, granite,* &c.	*Inferior order.*	Primitive class.	Primitive class.

In all these formations, from the lowest to the highest, we find a repetition of rocks and beds of similar chemical compositions; i. e. siliceous, argillaceous, and calcareous, but with a considerable difference in texture; those in the lowest formations being compact and often crystalline, while those in the highest and most recent are loose and earthy. These repetitions form what the Wernerians call formation suites. We may mention,

1st. The *limestone suite.* This exhibits, in the inferior or primitive order, crystalline marbles; in the two next, or transition and carboniferous orders, compact and subcrystalline limestones (Derbyshire limestone) in the supermedial or floetz order, less compact limestone (lias), calcareous freestone (Portland and Bath stone), and chalk; in the superior or newest floetz order, loose earthy limestones.

2d. The *argillaceous suite* presents the following gradations; clay slate, shale of the coal measures, shale of the lias, clays alternating in the oolite series, and that of the sand beneath the chalk; and, lastly, clays above the chalk.

3d. The *siliceous suite* may (since many of the sandstones of which it consists present evident traces of felspar and abundance of mica, as well as grains of quartz, and since mica is more or less present in every bed of sand) perhaps deserve to have granite placed at its head, as its several members may possibly have been derived from the detritus of that rock: it may be continued thus; quartz rock and transition sandstone, old red sandstone, millstone grit, and coal grits, new red sandstone, sand and sandstone beneath the chalk, and above the chalk. In all these instances a regular diminution in the degree of consolidation may be perceived in ascending the series.

We noticed before, that the remains of vegetables and animals are confined to the secondary formations. We have now to add, that they are not irregularly dispersed throughout the whole series of these formations, but disposed as it were in families, each formation containing an association of species peculiar in many instances to itself, widely differing from those of other formations, and accompanying it through its whole course; so that at two distinct points on the line of the same formation, we are sure of meeting the same general assemblage of fossil remains. It will serve to exemplify the laws which have been stated, if the observer's attention is directed to two of the most prominent formations of this island; namely, the chalk and the limestone which underlie the coal in Northumberland, Derbyshire, South Wales, and Somerset. Now, if he examines a collection of fossils from the chalk of Flamborough Head, or from that of Dover Cliffs, or, it may be added, from Poland or Paris, he will find eight or nine species out of ten the same; he will observe the same echinites associated with the same shells; nearly one half of these echinites he will perceive to belong to divisions of that family unknown in a recent state, and indeed in any other fossil bed except the chalk. If he next proceeds to inspect parcels of fossils from the carboniferous limestone, he will in the same manner find them to agree with each other, from whichever of the above localities they may have been brought; that is, he will find the same corals, the same encrinites, the same productæ, terebratulæ, spiriferæ, &c. But, lastly, if he compares the collection from the chalk with that from the mountain lime, he will not find one single instance of specific agreement, and in very few instances any thing that could deceive even an unpractised eye, by the superficial resemblance of such an agreement.

If we cast a rapid view over the phenomena of this distribution, the subject must appear to present some of the most singular problems which can engage the attention of the inquirer into nature. First we have a foundation of primitive rocks destitute of these organic remains; in the next succeeding series (that of transition), corals, encrinites, and testacea, different however from those now known, appear at first sparingly. The fossil remains of the carboniferous limestone are nearly of the same nature with those in the transition rocks, but more abundant; the coal measures (coal strata) however, themselves, which repose on this limestone, present scarcely a single shell or coral; but, on the contrary, abound with vegetable remains, ferns, flags, reeds of unknown species, and large trunks of succulent plants, *strangers to the present globe.* Upon the coal rest beds again containing marine remains (the magnesian limestone), then a long interval (of new red sandstone) intervenes, destitute almost, if not entirely, of organic remains, preparing the way, as it were, for a new order of things. This order commences in the lias, and is continued in the oolites, green and iron sands, and chalk. All these beds contain corals, encrinites, echinites, testacea, crustacea, vertebral fishes, and marine oviparous quadrupeds, yet widely distinguished from the families contained in the lower beds of the transition and carboniferous class, and particularly distinguished among themselves, according to the bed which they occupy. Hitherto the remains are always petrified, i. e. impregnated with the mineral substance in which they are imbedded. But lastly, in the strata which cover the chalk, we find the shells merely preserved, and in such a state, that when the clay or sand in which they lie is washed off, they might appear to be recent, had they not lost their colour, and become more brittle. Here we find beds of marine shells alternating with others peculiar to fresh water, so that they seem to have been deposited by *reciprocating inundations of fresh and salt water.* In the highest of the regular strata, the crag, we at length can find an identity with the shells at present existing on the same coast; and, lastly, over all these strata indiscriminately there is spread a covering of gravel (seemingly formed by the action of a deluge, which has detached and rounded by attrition fragments of the rocks over which it swept) containing the remains of numerous land quadrupeds, many of them of unknown genera or species (the mastodon, and the fossil species of the elephant, or mammoth, bear, rhinoceros, and elk,) mingled with others (hyænas, &c.) equally strangers to the climates where they are now found, yet associated with many at present occupying the same countries.

Another class of substances imbedded in the secondary strata, and throwing light on the convulsions amidst which they have been formed, are the pebbles, or rolled fragments of rocks, older than themselves, which they are often found to contain. Thus the lower beds of the supermedial order (namely, the conglomerate rocks of the new red sandstone) contain in great abundance rolled fragments of the carboniferous limestone belonging to the class next below it (the medial order), as well as of many still older rocks; being in fact only a consolidated mass of gravel, composed of *débris* of these rocks.

The necessary inferences from this fact are, first, The rock whence the fragments were derived must have been consolidated, and, subsequently to that consolidation, have been exposed to the mechanical violence (probably the action of agitated waters) which tore from it these masses, and rounded them by attrition, before the rock in which these fragments are now imbedded was found: and, secondly, Since loose gravel beds (and such must have been the original form of these, though now consolidated into conglomerate rocks) cannot be accumulated to any extent from the action of gravity on a highly inclined plane, we are sure, when we find such beds as we often do, in nearly vertical strata, that this cannot have been their original position, but is one into which they have been forced by convulsions which have dislocated them subsequently to their conglomeration. These consolidated gravel beds are called conglomerates, breccias, or pudding stones; we find them among the transition rock, in the old red sandstone, in the millstone grits and coal grits, in the lower members of the new red sandstone, in the sand strata, beneath the chalk, and in the gravel beds associated with the plastic clay, and interposed between the chalk and great London clay.

From the occurrence of the marine remains lately noticed, occupying, as they do, rocks spread over two thirds of the surface of every part of our continents which have been explored, and rising to the highest situations, even to the loftiest summits of the Pyrenees, and still more elevated points on the Andes, it is an inevitable inference, that the greater part of those continents have not only been covered by, but have been formed of materials collected within the bosom of the ocean; that we inhabit countries which we may truly call *factas ex æquore terras*. The great and fundamental problem, therefore, of theoretical geology, is obviously to assign adequate causes for the change of level in this ocean, which has permitted these masses, which once formed the bottom of its channel, to rise in hills and mountains above its waves. The causes which it is possible to imagine are reducible to two general classes. First, the decrease of the absolute quantity of water. This must have resulted from causes entirely chemical, namely, the decomposition of some portion of the water, its constituents entering into new forms of combination; and its fixation in the rocks formed beneath it. It is probable that these causes have operated in some degree; but it seems impossible to ascribe to them the very great difference of level for which we have to account.

The second class of possible causes is entirely mechanical; those, namely, which may have produced a change of relative level without any diminution of absolute quantity in the waters.

The causes of this kind which have been proposed are, first, The absorption of the water into a supposed central cavity; but the now ascertained density of the earth (being greater than that which would result from an entirely solid sphere of equal magnitude of the most compact known rock), renders the existence of any such cavity very doubtful.

Secondly, A writer in the Journal of the Royal Institution, vol. ii. has proposed the very ingenious hvpothesis, that a change of temperature of a few degrees will, from the unequal expansibility of the materials of land and water, sufficiently account for this change of level.

Thirdly, It has been ascribed to violent convulsions, which have either heaved up the present continents, or, which amounts to the same thing, (as the same relative change must have taken place in either view) depressed the present channel of the ocean. If the violent elevation of the continent, or depression of the channel of the ocean, supposed in the last mentioned hypothesis, really took place, it must have left traces in the disturbed, contorted, and highly inclined position of the strata; and these disturbances must be greatest where the change of level has been the greatest, i. e. in the neighbourhood of the loftiest mountains. Now this is actually the case.

In support of the hypothesis which ascribes an important part to volcanic agency in modifying the surface of our planet, the following, at least plausible, arguments may be adduced.

1. It must be kept in view, that the object is to assign an adequate cause for the undoubted fact of the emergence of the loftiest mountains of the present continent; and that when so mighty an effort is to be accounted for, the mind must be prepared to admit, without being startled, causes

of a force and energy greatly exceeding those with which we are acquainted from actual observation.

2. The broken and inclined state, and inclined position of the strata composing those continents, many of which must have been at the time of their original formation horizontal, indicate, as we have seen, that one at least of the causes operating to effect this great change of relative level between the land and waters, was the elevation of the former by mechanical force.

3. The only agent with which we are acquainted, whose operation bears any analogy to the effects above specified, is the volcanic energy, which still occasionally forms new islands, and elevates new mountains.

4. Although these effects are now indeed partial and limited, yet there is certain proof that volcanic agency has formerly been much more active; the extinct volcanoes of the Rhine, Hungary, and Auvergne, as well as those which occupy so large a portion of Italy, where only one remains in activity, concur in proving, that at present we experience only the expiring efforts, as it were, of those gigantic powers which have once ravaged the face of nature.

5. If to this certain proof of the greater prevalence of volcanic convulsions in earlier, but still comparatively recent, periods of the history of our planet, we add the presumption that the trap rocks (so singularly intruded among the regular strata, and producing, where they traverse those strata, so precisely the effects of heat acting under compression, and so different in all their phenomena from formations decidedly aqueous) were of volcanic origin, we shall find scarcely a country exists which has not been a prey to the ravages of this powerful principle. If, with many of the best geological observers (Dr. M'Culloch, Von Buch, Necker, &c.), we incline to extend the same con-

clusions to granitic rocks, a mass of volcanic power, clearly adequate to all the required effects, is provided.

6. The question will undoubtedly present itself, what is the source of volcanic action? And sufficient proof exists, that this source is deeply seated beneath the lowest rocks with which our examination of the earth's surface makes us acquainted; for, in Auvergne, the lavas have evidently been erupted from beneath the primitive rocks.

7. The very important recent discoveries with regard to the increased temperature noticed in descending deep mines, &c. by Messrs. Fox and Fourrier, will, if confirmed by further examination, prove, that some great source of heat exists beneath the earth's crust.

8. A degree of presumption may be thought to arise from these considerations, that the crust of the earth rests on a heated nucleus, the true source of volcanic energy. If this nucleus be in a fluid or viscous state, its undulations would readily account for the convulsions which have affected that crust, both in originally dislocating and elevating portions of its strata, and in the actual phenomena of earthquakes (of many of which phenomena no other hypothesis appears to offer a sufficient explanation) while, at the same time, it would afford an adequate reason for the figure of the globe as a spheriod of rotation.

9. On this supposition, we should at once perceive a reason why the effects of the volcanic force may have been much more violent in earlier periods, while that mass of deposites which now covers the supposed volcanic nucleus was but gradually forming over it than at present; and we shall also find a reason for the higher temperature, which many of the remains of both the animal and vegetable kingdoms, found in the strata of countries now too cold for the existence of their recent analogies, appear to indicate as having formerly prevailed.

10. It must be remembered, that one of the essential conditions of the theory above sketched is, the operation of volcanic agency beneath the pressure of an incumbent ocean; and that it does not, therefore, in any degree question the Neptunian origin of the majority of the rocks which have evidently been formed in the bosom of the ocean. With regard to the trap rocks alone, and perhaps the granitic, does it venture even to insinuate an opposite mode of formation.

Mr. Conybeare next shows, that the Wernerian generalization of the phenomena is too hasty. It supposes the basset edges of the strata to occupy levels successively lower and lower in proportion as they are of less ancient formation, and as they recede from the primitive chains, forming the edges of the basins in which they had been deposited. For if we compare the basset edges of the same strata on the opposite sides of the great European basin (assuming the primitive ranges of Great Britain as one of its borders, and those of the Alpine chains as the other) we shall find their level totally different.

The oolite, for instance, whose highest point in England is less than 1200 feet, attains a height of more than 4000 in the Jura chain, and in the mountains of the Tyrol has been observed by Mr. Buckland crowning some of the loftiest and most rugged summits of the Alps themselves. Again, if we compare the inclination of the strata at the edges of the basin, we shall find every thing but the supposed regular gradation, from a highly elevated to a horizontal position; on the contrary, we shall see the horizontal beds generally reposing at once upon the truncated edges of those which lie at very considerable angles; and in place of the general conformity or parallelism which ought to prevail between the several formations, we shall observe, in many instances, appearances of the greatest irregularity in this respect; and these irregularities will be found to increase in approaching those chains which are the most elevated.

But if we suppose, that during the regular and gradual subsidence of the level of the ocean in the Wernerian system, the continents were elevated by mechanical forces acting in a series of great convulsions, we shall perhaps obtain a nearer approximation to agreement with the actual phenomena as deduced from observation. If these convulsions resulted from volcanic agency, we have already seen that there is every reason to believe this cause to have acted with most violence in the earliest periods; and this will sufficiently account for the greater derangement of the earlier rocks. That the valleys have been, in many instances, entirely excavated by the agency of powerful aqueous currents, and in all, greatly modified by the same cause, seems as completely proved as the nature of the case can possibly admit. The same diluvial agency that has excavated the valleys, appears also to have swept off the superior strata from extensive tracts which they once covered. The proofs of this are to be found in insulated hills, or *outliers* of those strata, placed at considerable distances from their continuous range, with which they have every appearance of having been once connected; in the abrupt and truncated escarpments which form the usual termination of the strata, and in the very great quantity of their *débris*, scatttered frequently over tracts far distant from those where they still exist *in situ*. This stripping off the *superstrata* is appropriately termed *denudation.*

The most important agency of this kind appears to have been exerted at an early period, and subsequently to the consolidation of all the strata, by an inundation which must have swept over them universally, and covered the whole surface with their *débris* indiscriminately thrown together, forming the last great geological change to which the surface of our planet appears to have been exposed.

To this general covering of water-worn *débris* derived from all the strata, the name of *diluvium* has been given, from the consideration of that great and universal catastrophe to which it seems most properly assignable. By this name it is intended to distinguish it from the partial *débris* occasioned by causes still in operation; such as the slight wear produced by present rivers, the more violent action of torrents, &c. To the latter the name of *alluvium* has lately been appropriated. It does not seem possible to assign any single and uniform direction to the currents which have driven the diluvial *débris* before them; but they appear in every instance to have flowed (which indeed must of necessity be the case with the currents of subsiding waters) as they were determined by the configuration of the adjoining country; from the mountains, that is, towards the lower hills and plains. As far as England is concerned, this principle will produce a general tendency to a direction from north west towards south and east, greatly modified, however, by obvious local circumstances.

" Another circumstance connected with the distribution of these travelled fragments is, that we often find them in masses of considerable size, accumulated in situations now separated by the intervention of deep valleys from the parent hills (if we may so speak), whence we know them to have been torn. This appears to be a demonstrative proof that these intervening valleys must have been excavated subsequently to the transportation of these blocks; for though we can readily conceive how the agency of violent currents may have driven these blocks down an inclined plane, or if the *vis a tergo* were sufficient, along a level surface, or even a slight and very gradual acclivity;

it is impossible to ascribe to them the Sisyphean labour of rolling rocky masses, sometimes of many tons in weight, up the face of abrupt and high escarpments. The attention of geologists was first directed to this phenomenon by the discoveries of Saussure, who noticed one of its most striking cases—the occurrence of massive fragments torn from the primitive chains of the Alps, scattered at high levels on the escarpment of the opposite calcareous and secondary chains of the Jura, although between the two points the deep valley containing the lake of Geneva is interposed. This phenomenon is one of very common occurrence. The downs surrounding Bath (Hampton Down for example), though abruptly scarped, and surrounded by valleys more than six hundred feet deep, have yet on their very summits flints transported from the distant chalk hills. The simplest explanation of this fact will be, that these fragments were transported by the first action of the currents, before they had effected the excavation of the valleys, now cutting off all communication with the native rocks whence they were derived.

"The organic remains of land animals dispersed through this diluvial gravel must, with the greatest probability, be referred to the races extinguished by the great convulsion which formed that gravel; many of them are of species still inhabiting the countries where they are thus found; some of the species now inhabiting only other climates; and some few, of species and genera now entirely unknown.

"To the same period we may ascribe the bones of the *same species with the above*, found in many caverns; but, in many of these instances, it is probable that some of the animals now found there, previously inhabited them as their dens. Professor Buckland appears to have proved satisfactorily, that this must have been the case in the remarkable instance of the cavern lately discovered near Kirby Moorside, Yorkshire. Here the remains found in the greatest abundance are those of hyænas; with these are mingled fragments of various animals, from the mammoth to the water rat. All the bones present evident traces of having been mangled and gnawed: and the whole are buried in a sediment of mud subsequently incrusted over by stalactitical depositions. Professor Buckland's explanation is, that this cavern was occupied by the hyænas; who, according to the known habits of these animals, partially devoured even the bones of their prey, and dragged them for that purpose to their dens; around their retreats, a similar *congeries* of mangled bones has been noticed by recent travellers. The proofs of these points, deduced from the circumstances of the cavern, the state of the bones, and the ascertained habits of the animal in question, appear to be decisive. The sediment in which the bones are imbedded, and the occurrence of the remains of the mammoths, and other species, only known (in these climates at least) in a fossil state, in the diluvial gravel, clearly refers their remains to the same era. Caverns containing bones of a similar class, the mammoth, the fossil species of rhinoceros, &c. have been found near Swansea, at Hatton Hill (on the Mendip chain in Somersetshire), and near Plymouth. *Rev. W. Conybeare, Introduction.*

"The ancient history of the globe, which may be regarded as the *ultimate* object of geological researches, is undoubtedly one of the most curious subjects that can engage the attention of enlightened men. The lowest and most level parts of the earth, when penetrated to a very great depth, exhibit nothing but horizontal strata, composed of various substances, and containing almost all of them innumerable marine productions. Similar strata, with the same kind of productions, compose the hills even to a great height. Sometimes the shells are so numerous as to constitute the entire body of the stratum. They are almost every where in such a perfect state of preservation, that even the smallest of them retain their most delicate parts, their sharpest ridges, and tenderest processes. They are found in elevations far above the level of every part of the ocean, and in places to which the sea could not be conveyed by any previously existing cause. They are not merely enclosed in loose sand, but are often incrusted and penetrated on all sides by the hardest stones. Every part of the earth, every hemisphere, every continent, every island of any size, exhibits the same phenomenon. We are therefore forcibly led to believe, not only that the sea has at some period covered all the plains in England, but that it must have remained there for a long time, and in a state of tranquillity; which circumstance was necessary for the formation of deposites so extensive, so thick, in part so solid, and containing *exuviæ* so perfectly preserved. A nice and scrupulous comparison of the forms, contexture, and composition of these shells, and of those which still inhabit the sea, cannot detect the slightest difference between them. They have therefore, once lived in the sea, and been deposited by it; the sea consequently must have rested in the spots where the deposition has taken place. Hence it is evident, that the basin or reservoir containing the sea has undergone some change, either in extent, situation, or both.

"The traces of revolutions become still more apparent and decisive when we ascend a little higher, and approach nearer to the foot of the great chain of mountains. There are still found many beds of shells; some of these are even larger and more solid; the shells are quite as numerous, and as entirely preserved; but they are not of the same species with those which were found in the less elevated regions. The strata which contain them are not so generally horizontal; they have various degrees of elevation, and are sometimes situated vertically. While in the plains and low hills it was necessary to dig deep in order to detect the succession of the strata, here we perceive them by means of the valleys, which time or violence has produced, and which disclose their edges to the eye of the observer.

"Thus the sea, previous to the formation of the horizontal strata, had formed others, which by some means have been broken, lifted up, and overturned in a thousand ways. But the sea has not always deposited stony substances of the same kind. It has observed a regular succession as to the nature of its deposites; the more ancient the strata are, so much the more uniform and extensive are they; and the more recent they are, the more limited are they, and the more variation is observed in them at small distances. Thus the great catastrophes which have produced revolutions in the basins of the sea, were preceded, accompanied, and followed, by changes in the nature of the fluid, and of the substances which it held in solution; and when the surface of the seas came to be divided by islands and projecting ridges, different changes took place in every separate basin.

"These irruptions and retreats of the sea have neither been slow nor gradual; most of the catastrophes which have occasioned them have been sudden; and this is easily proved, especially with regard to the last of them, or the Mosaic deluge, the traces of which are very conspicuous. In the northern regions it has left the carcasses of some large quadrupeds, which the ice had arrested, and which are preserved even to the present day, with their skin, their hair, and their flesh. If they had not been frozen as soon as killed, they must have been quickly decomposed by putrefaction. But this perpetual frost could not have taken possession of the regions which these animals inhabited, except by the same cause which destroyed them: this cause must therefore have been as sudden as its effect. The two most remarkable phenomena of this kind, and which must forever banish all idea of a slow and gradual revolution, are the rhinoceros, discovered in 1771 on the banks of the Vilhoui, and the elephant, recently found by Mr. Adams near the mouth of the Lena. This last retained its flesh and skin, on which was hair of two kinds; one fine, short and crisped, resembling wool, and the other like bristles. The flesh was still in such high preservation, tbat it was eaten by dogs. Every part of the globe bears the impress of these great and terrible events so distinctly, that they must be visible to all who are qualified to read their history in the remains which they have left behind.—See *Cuvier's Theory of the Earth.*

"I shall conclude this article by stating, that this naturalist, the most learned of the present day, as well as Dolomieu, Deluc, and Greenough, concur in thinking, that not above five or six thousand years have elapsed since the period of the deluge, which agrees with the Mosaic account of that catastrophe."

The fossil remains, above alluded to, belong to a great variety of classes, and, as we have already seen, are not unfrequently of extinct species. They are also, in some instances, of a magnitude much superior to any of the similar animals which we now possess. Vestiges have been discovered of beasts, birds, fishes, the crustaceous tribes, plants, and even seeds, fruits, and flowers. Of the contemporary exixtence of man, however, not a trace is to be seen. At least, the largest portion, but probably the whole of the creatures whose fossilized wrecks are scattered over the globe had no earthly master.

Among the gigantic species which have ceased to exist, may be noticed an elk, nine feet long, six feet high, and more than nine feet and a half in height to the tip of the right horn—a bat, which must have measured nearly seven feet between the tips of the wings—a bear, the Ursus spæleus, rivalling the horse in magnitude—the Megatherium, a species of sloth, the most massive, rude, and unshapely of quadrupeds, whose skeleton has a length of fourteen Spanish feet, and a height of seven—the great mastodon of the Ohio, as tall as the elephant, but with larger and thicker limbs—a tapir, eighteen feet long, and twelve high—the Lacerta gigantea, or Mosasaurus, a lizard, the skeleton of which is twenty-four feet long—and the still more enormous Megalosaurus, of the same class, which has the amazing length of forty feet, with a height of eight.

CHAP. II.

Of Mountains....Precipices....Clefts, or Caverns....Rivers... the Nile....Cataracts....Subterraneous Rivers....Saltness of the Sea....of different Seas....of Lakes...their Nature and Properties.

Were the earth an even and regular plain, instead of that beautiful variety of hills and valleys, of verdant forests, and refreshing streams, which at present delight our senses, a dismal sea would cover the whole face of the globe, and at best it would only be the habitation of fishes.

It is not therefore to be supposed that even in its origin the surface of the earth was perfectly regular; and since its first production a variety of causes have greatly contributed to the increase of this irregularity.

The greatest inequalities, are the depths of the ocean, compared to the elevations of mountains; the depth is very different even at great distances from land; and the most general profundities are from sixty to one hundred and fifty fathoms. The gulfs bordering on the coasts are much less deep, and the straits have generally the least depth.

The highest MOUNTAINS in Asia are Mounts Imaus, Taurus, Caucasus, and the mountains of Japan; all these mountains are loftier than those of Europe: and those of a part of Imaus, or Himalaya, have recently been ascertained to be the loftiest on the globe. The highest mountains in Africa, i. e. the great Atlas, and the Mountains of the Moon,* are at least as high as those in Asia, with the exception of the Himalaya; but those which were long supposed to be the highest of all are in South America, particularly the Andes in Peru, which are more than three thousand fathoms, that is, upwards of three miles high; whereas the highest part of the Alps is not more than one thousand six hundred fathoms, or a mile and a half in height. In general the mountains between the tropics are loftier than those of the temperate zones, and these more than those of the frigid zone; so that the nearer we approach the equator, the greater are the inequalities of the earth: these inequalities, although very considerable with respect to us, are nothing when considered with respect to the terrestrial globe. Three thousand fathoms difference to three thousand leagues diameter, is one fathom to a league, or one foot to two thousand three hundred feet, which on a globe of two feet and a half diameter, does not make the sixth part of a line, or the ninetieth part of an inch. Thus the earth, which appears to us crossed and cut by the enormous height of the mountains, and by the frightful depth of the sea, is nevertheless, relatively to its volume, only very slightly furrowed with irregularities, so very trifling, that they can cause no difference to the figure of the globe.

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* Famous for giving a source to the rivers Niger and Nile.

In continents the mountains are continued, and form chains. In islands they appear to be more interrupted and isolated, and generally raised above the sea, in form of a cone or pyramid, and are called *peaks*. The peak of Teneriffe is one of the highest mountains on the earth; it is nearly a mile and a half high perpendicular from the level of the sea: the peak of St. George in one of the Azores, and the peak of Adam in the island of Ceylon, are also very lofty. All these peaks are composed of rocks heaped one upon the other, and they occasionally vomit forth fire, cinders, bitumen, minerals, and stones. There are even islands which are precisely only as tops of mountains, as the island of St. Helena, Ascension, most of the Azores, and Canaries: and we must remark, that in most of the islands, promontories, and other projecting lands in the sea, the middle is always the highest, and they are generally separated by chains of mountains, which divide them in their greatest length.

Precipices are formed by the sinking of rocks, the base of which sometimes gives way more on one side than the other, by the action of the air and frost, which splits and divides them; and by the impetuous fall of torrents, which opens passages, and carries along with them all that opposes their violence. But ABYSSES, that is, those vast and enormous cavities found at the summit of mountains, and to the bottom of which it is not possible sometimes to descend, although they are above a mile or half a mile round, have generally been formed by the operation of fire. These abysses were formerly the funnels of volcanoes, and all the matter which is there deficient has been ejected by the action and explosion of these fires, which are since extinguished through a defect of combustible matter. The abyss of mount Ararat, of which M. Tournefort gives a description in his voyage to the Levant, is surrounded with black and burnt rocks, as one day the abysses of Etna, Vesuvius, and other volcanoes will be, when they have consumed all the combustible matters they include.

There are other abysses, which are not on the summits of mountains. Many of them, perhaps all, are only openings to caverns. Plot, in his Natural History of Staffordshire, speaks of a gulf called Elden Hole, in Derbyshire, on the side of a hill, the opening of which was not more than seven yards one way, and fifteen the other, and to which no bottom could be found. Cotton says, that he sounded it in vain with a line of eight hundred fathoms. Some years since, however, a Mr. Lloyd succeeded in exploring this supposed bottomless profundity. "He was let down," says the narrative, "by two ropes about forty fathoms long; for the first twenty yards, though he descended obliquely, he could assist himself with his hands and feet; but below this, the rock projecting in large irregular crags, he found it very difficult to pass; and on descending ten yards more, he perceived that the rope by which he was suspended was at least six yards from the perpendicular. From hence, the breadth of the chink was about three yards, and the length about six; the sides were very irregular, and the crags were covered with moss, besides being wet and dirty. Within fourteen yards of the bottom, the rock opened on the east side, and he swung till he reached the floor of the cavern, which was at the depth of sixty-two yards from the mouth. The light, however, which came from above was sufficient to read any print. Here he found the cavern to consist of two parts: that in which he alighted was like an oven; the other, where he first began to swing, was a vast dome, shaped like the inside of a glass-house, and a small arched passage formed a communication between them; in this passage the stones which had been thrown in at the top (with the hope of filling up the abyss) formed a slope, extending from the wall at the west side of the first dome almost to the bottom of the second cave or oven, so that the farther end of the cave was lower by twenty-five yards than where he alighted. The diameter of this cavern he judged to be about fifty yards; the top he could not trace with his eye, but had reason to believe that it extended to a prodigious height; for, when he was nearly at the top of one of the incrusted rocks, which was an elevation of at least twenty yards, he could even then see no enclosure of the dome, though of course he saw much farther than when he stood at the bottom. After climbing up a few loose stones on the south side of the second cavern, he descended again through a small aperture, into a little cave, about four yards long, and two yards high, which was lined throughout with a kind of sparkling stalactites of a very fine deep yellow, with some small stalactical drops hanging from the roof. He found a noble column, of about ninety feet in height, of the same kind of incrustation, facing the first entrance. As he proceeded to the north, he came to a large stone, that was covered with the same substance, and under it he found a hole two yards deep, that was uniformly lined with it. From the edge of this hole sprung a rocky ascent, sloping like a buttress against the side of the cavern, and consisting of vast solid round masses, of the same substance and colour. He climbed up this ascent, to the height of about sixty feet, and got some fine pieces of the stalactites, which hung from the craggy sides of the cavern which joined the projection he had ascended. Having got down, which was not effected without considerable difficulty and danger, he proceeded in the same direction, and soon came to another pile of incrustations of a different kind and colour; these being much rougher, and not tinged with yellow but brown. At the top of this he found a small cavern, opening into the side of the vault, which he entered, and where he saw vast drops of the stalactites hanging, like icicles, from every part of the roof; some of which were four or five feet long, and as thick as a man's body. The greater part of the walls of the large cavern, or vault, was lined with incrustations of three kinds: the first was the deep yellow stalactites; the second was a thin coating, resembling a light-coloured varnish (this covered the limestone, and reflected the light of the candles with great splendour); the third was a rough efflorescence, every shoot of which resembled a kind of rose flower. He now returned through the arch which separates the two vaults, reascending the slope of loose stones, which greatly lessened the magnificence of the entrance into the inner cavern. When he had again fastened the rope to his body, he gave the signal to be drawn up, which he found much more dangerous and difficult than being let down, on account of his weight drawing the rope between the fragments of the rocks, to which he adhered, and his body jarring against the sides, notwithstanding the defence he made with his hands. The rope also loosened the stones over his head, the fall of which he dreaded every moment; and if any of them had fallen, he must inevitably have perished. Being obliged to ascend with his face towards the wall, he could not make any particular observations on the rocks that were behind or on each side of him; he saw, however, under the projection of the rock, where the passage first became narrow, the entrance of a cavern which seemed to penetrate a great way, but he could not get into it."

A far more terrific abyss exists in the bowels of a rock near Castleton, in Derbyshire, into which a level has been driven, in search of lead ore. The visiter enters by a descent of a hundred and six steps, and then proceeds along a canal, which has been blasted out of the solid stone. "At the distance of six hundred and fifty yards from the entrance, the level bursts into a tremendous gulf, whose roof at bottom is completely invisible; but across which the navigation has been carried by flinging a stone arch over a part of the fissure where the rocks are least separated. Here, leaving the boat, and ascending a stage erected above the level, the attention of the visiter is directed to the dark recesses of the abyss beneath his feet; and firm, indeed, must be his resolution, if he can contemplate its depth unmoved, or hear them described without an involuntary shudder. To the depth of ninety feet all is vacuity and gloom; but beyond that commences a pool of Stygian waters, not unaptly named the Bottomless Pit; whose prodigious range may in some measure be conceived, from the circumstance of its having swallowed up more than forty thousand tons of rubbish made in blasting the rock, without any apparent diminution either in its depth or extent. The guide indeed informs you that the latter has not been ascertained; yet we have reason to believe that this is incorrect, and that its actual depth of standing water is about three hundred and twenty feet. There cannot be a doubt, however, but that this abyss has communications with others still more deeply situated in the bowels of the mountain, and into which the precipitated rubbish has found a passage. The superfluous water of the level falls through a water-gate into this profound caldron, with a noise like a rushing torrent. This fissure is calculated to be nearly two hundred and eighty yards below the surface of the mountain; and so great is its reach upwards, that rockets of sufficient strength to ascend four hundred and fifty feet have been fired without rendering the roof visible. The effect of a Bengal light discharged in this stupendous cavity is extremely magnificent and interesting."

A dreadful cavern in India is described by Ælian. "In the country of the Arian Indians," says that author, "is to be seen an amazing chasm, which is called The Gulf of Pluto. The depth and the recesses of this horrid place are as extensive as they are unknown. Neither the natives, nor the curious who visit it, are able to tell how it first was made, or to what depths it descends. The Indians continually drive thither great multitudes of animals, more than three thousand at a time, of different kinds, sheep, horses, and goats; and, with an absurd superstition, force them into the cavity, whence they never return. Their several sounds, however, are heard as they descend; the bleating of sheep, the lowing of oxen, and the neighing of horses, issuing up the mouth of the cavern. Nor do these sounds cease, as the place is continually furnished with a fresh supply."

Great cavities and deep mines are generally in mountains, and they never descend to a level with the plains; therefore, by these cavities, we are only acquainted with the inside of a mountain, and not at all with the internal part of the globe.

It was for a long time thought that the chains of the highest mountains ran from east to west, till the contrary direction was discovered in the new world; but no person before Mr. Bourguet discovered the surprising regularit of the structure of those great masses: he found, after having crossed the Alps thirty times in fourteen different parts, twice the Apennine mountains, and made several tours in the environs of these mountains, and in mount Jura, that all mountains are formed nearly like the works of a fortification. When the body of the mountain runs from east to west, it forms prominences, which face as much as possible the north and south; this admirable regularity is so striking in valleys, that we seem to walk in a very regular covered way; if, for example, we travel in a valley from north to south, we perceive that the mountain which is on the right forms projections or angles which front the east, and those of the mountain on the left front the west, so that, in fact, the salient angles of each side reciprocally answer the returning angles, which are always alternately opposed to them. The angles which mountains form in great valleys are less acute, because the direction is less steep, and as they are farther distant from each other; and in plains they are not so perceptible as in the course of rivers, which generally take up their elbows; the middle of them naturally answers to the most striking projections, or the most advanced angles of mountains; and this is one cause of the serpentine course of rivers. When in a valley the inclination of one of the mountains which border it is less steep than that of the other, the river takes its course much nearer the steepest mountain, and does not flow through the middle.

Modern writers class mountains into systems, groups, chains, and branches. A *branch* is an assemblage of minor mountains, extending from a chain. A *chain* is an aggregate of considerable mountains, which sometimes changes its name, when it is of great extent. It may be insulated, or may form part of a group. A *group* is the union of several chains which stretch out in various directions. A *system* is composed of several groups, connected together, whatever may be their extent or elevation.

According to this arrangement, the mountains of Europe form four systems; those of Asia four; those of Africa four, and those of America five.

The European systems are,

A. The HISPANIC SYSTEM, composed of the Pyrenees and of all the mountains of Spain and Portugal, and which consists of six groups.

1. The *Pyrenaic* group, formed of all the chains belonging to the Pyrenees. Its highest point is the Maladetta, which has an altitude of 1787 fathoms. 2. The *Iberic* group, comprehends the Sierràs of Occa, Moncayo, Molina, and several others; one of its branches terminates at Cape St. Martin, and the other near the banks of the Segura. Its point of extreme height is the Sierra de Moncayo, which has an elevation of 1500 fathoms. 3. The *Carpetanovettonic* group, which is linked with the preceding, and divides the course of the Douro from that of the Tagus, has its loftiest point in the Sierra de Gredos, which rises to 1650 fathoms. 4. The *Lusitanic* group, which stretches towards the south of Portugal. Highest point, of 800 fathoms, the Sierra de Guadalupe. 5. The *Mariano-cuneic* group comprehends the Sierra Morena, and the mountains which divide Algarve from Alentejo. The Sierra Sagra, its loftiest point, has a height of 928 fathoms. 6. The *Betic* group, the least important in extent, but the most considerable with respect to elevation, constitutes one of the basins of the Guadalquivir, and, by the prolongation of one of its branches, forms the rock of Gibraltar. Its culminant point, the Cerro de Mulhaçen, rises to 1823 fathoms.

B. The ALPINE SYSTEM covers a sixth part of Europe with its ramifications, and may be divided into five groups.

1. The *Western* or *Franco-Celtic* group, comprehending all the mountains of France, the Low Countries, and a part of Rhenish Prussia, is composed of chains more or less distinct, and its loftiest point, 973 fathoms, is the Puy de Sancy. 2. The *Central* or *Helvetic* group, comprising the chain of the Jura, the Greek, Cottian, Lepontine Alps, &c. Mount Blanc towers above all, to an elevation of 2460 fathoms. 3. The *Southern* or *Italic* group includes the various branches of the Apennine, and their extension into Sicily. Its highest summits are Monte Cavallo, in Ulterior Abruzzo, which has 1489 fathoms, and Mount Etna, in Sicily, which has 1700 fathoms. 4. The *Oriental* or *Slavo-Hellenic* group, composed of several chains and branches, which extend into Bosnia, Servia, Bulgaria, Thrace, Macedonia, Albania, Epirus, Thessaly, and the Morea. Its loftiest points are Mont Dinara, 1166 fathoms; the chain of Pindus, 1400 fathoms; the Balkan, 1300 to 1400 fathoms; and the chain of Rhodope, 1200 fathoms. 5. The *Northern* or *Slavo-Germanic* group is divided from the central group by the lake of Constance, the Lech, and the Danube. Its most elevated point, in the eastern Carpathians, is the Ruska-Poyana, which has 1550 fathoms; and, in the western Carpathians, the Eisthaler Spitze, which has 1333 fathoms.

C. The Sarmatic system is composed only of small mountains and very extensive table lands, which occupy European Russia, Fionia, Pomerania, and Eastern Prussia. The chain of the right bank of the Volga is its loftiest point, but rises only to 250 fathoms.

D. The Scandinavian system extends from the northern extremity of Europe, or Finmark, to the southern extremity of Sweden. It comprehends three groups. 1. The *group of Kœlen*, the highest point of which, the Sulitelma, has 951 fathoms. 2. The *group of Dovez*, the culminant point of which, the Sneehaelta, has 1270 fathoms. 3. The *group of Herdamguerfield*, the loftiest point of which is the summit of the Segnefield, 1123 fathoms.

E. The BRITANNIC SYSTEM contains four groups. 1. The *Northern*, composed of the mountains of Caithness, Inverness, &c. comprehends also the Orcadian and Hebridian islands, which are merely the extremities of their ramifications. 2. The group of the *Grampians*. 3. The group of the *Cheviots*; and, 4. The *Irish* group, formed of all the small chains which cover Ireland. The most towering point in the whole system is Ben Nevis, in the Grampians, which is 727 fathoms in height.

F. The SARDO-CORSICAN SYSTEM, so denominated by M. Burguine, in his Picture of Mountains, is composed of two groups. 1. The *Corsican* group, the highest point of which is Mont Rotondo, 1418 fathoms; and 2. The *Sardinian* group, the most elevated point of which is the Genargentu, 938 fathoms.

ASIA. The four Asiatic systems bear the following denominations.

A. The HIMALAYAN SYSTEM, the most considerable, not only of Asia, but of all the globe, is composed of four groups. 1. The *Uralian* group, which separates Europe from Asia; the highest point, 1416 fathoms, is mount Tanagai. 2. The *Altaic* group, which succeeds the first, in the direction of from west to east; its summits are, Mount Joblonnoi, which the Mongals call Daba, 2334 fathoms, and Mount Italizkoi, 1678 fathoms. 3. The *Indo-Persic* group, the principal chain of which is the Himalaya. The loftiest points of this group (and of the globe) are the Dhawalagiri, 4300 fathoms; the Chamalari, 4400 fathoms; and the peak of Jawahir, 4026 fathoms. 4. The *Sinic* group is separated from the Indo-Persic group by the course of the Burhampooter. Its most elevated points are, the Petcha or Hamar, about 3200 fathoms; and Mount O-lun-chun, about 2000 fathoms.

B. The INDIAN SYSTEM is separated from the Himalayan by the course of the Ganges. It is composed of four groups. 1. The *Kimur* mountains, the ramifications of which appear to unite with the mountains which cover the peninsula of Guzarat. 2. The *Gandwana* mountains, which unite, to the south west, with the Bundeh mountains. 3. The group of the *Ghauts*, which extends along the whole western coast of India. 4. The *Ceylonese* mountains, which are only a continuation of the Ghauts. The highest points are Mount Taddiandamalla, in the Ghauts, 887 fathoms, and Adam's Peak, in the island of Ceylon, 1000 fathoms.

C. The CAUCASIAN SYSTEM comprehends two groups. 1. That of *Caucasus*, the most elevated point of which is that of Kasbeck, 2400 fathoms; and 2. The group of *Taurus*, of which Mount Ararat, 1800 fathoms, is the highest point.

D. The ARABIAN SYSTEM, entirely separated from the preceding, is composed of three groups, which rise amidst the sandy deserts of Arabia. 1. The group of *Sinai*, elevated about 1000 fathoms. 2. The group of *Tehama*, which throws out branches in various directions. 3. The group of *Oman*, which borders on the coast of the Persian gulf.

AFRICA. According to what is known of this part of the globe, its mountains may be divided into four systems.

A. The ABYSSINIAN SYSTEM is composed of the great chain of the mountains of the Moon, of those of the mountains of Tegha, and of those which border the Red Sea. Mount Amba-Geshen, 2300 fathoms, is the loftiest point.

B. The CAFRO-GUINEAN SYSTEM begins to the north of the equinoctial line, comprehends the *Lupata* mountains, and those of the *Cape of Good Hope*, and terminates in small hills on the coast of Guinea. Its loftiest point is the highest peaks of the Nieuweveld mountains, which have an elevation of 1600 fathoms.

C. The SENEGAMBIAN SYSTEM gives birth to the rivers Senegal and Senegambia; its height is unknown.

D. The BARBARY SYSTEM. The chain of Mount *Atlas* and the *Ammer* mountains form its principal group. The *Atlas*, with an elevation of about 2300 fathoms, is its loftiest point.

AMERICA. The American continent comprises five systems, of which two belong to North America, and three to South America.

A. The OREGO-MEXICAN SYSTEM, beginning at the most northern extremity of America, and terminating near the Gulf of Darien, is divided into two groups. 1. The *Western* group, comprehending the *Cordillera of New Cornwall*, and that of *California;* the loftiest point is Mount Saint Elias, 2793 fathoms. 2. The *Eastern* group, comprising the *Oregon* or *Rocky Mountains*, the *Asark* mountains, the *Cordillera of New Mexico*, that of *Durango*, those of *Oaxaco* and of *Mexico*, and those of *Guatimala*, *Veragua*, and *Costa Rica*. The superior points of these are, the Big Horn, in the Rocky Mountains, about 2120 fathoms; the Popocatepelt, a volcano in the Cordillera of Oaxaco and Mexico, 2771 fathoms; the eastern peak in the Cordillera of Guatimala, 2330 fathoms.

B. The ALLEGHANIAN SYSTEM is formed of several chains united as one sole group. The loftiest point is the Washington, 1040 fathoms.

C. The ANDO-PERUVIAN SYSTEM may be considered as formed of four groups, which, strictly speaking, are the four great divisions adopted by Humboldt. 1. The *Cordilleras of New Grenada.* 2. The *Andes of Peru.* 3. The *Andes of Chili and Potosi.* 4. The *Patagonian Andes.* The highest points are, el Picacho, in the Sierra Nevada, about 3000 fathoms; the Peak of Tolima, in the chain of Quindiu, 2865 fathoms; Chimborazo, in the Peruvian Andes, 3350 fathoms; the mountain of Descabezado, in the Andes of Chili and Potosi, about 3300; and the Corcovado, in the Patagonian Andes, 1950 fathoms.

D. The PARIMIAN SYSTEM is composed of several chains, the most important of which is the *Sierra Parima*. The Duida, 1300 fathoms, is the loftiest point.

E. The BRASILIAN SYSTEM extends on the eastern coast of America, from the fourth degree of south latitude to the mouth of the Rio de la Plata. Its highest point, 932 fathoms, is the Itamba.

It may in general be said, that in Europe, Asia, and Africa, the RIVERS, and other Mediterranean waters, says Buffon, extend more from the east to the west than from north to south, which proceeds from the chains of mountains being for the most part so directed; and that, in other respects, the whole continent of Europe and Asia is broader in this direction than the other. It is in this direction, too, that all the rivers of America flow, because, excepting the Cordilleras, there are no very extensive chains of mountains, and none whose directions are parallel to them. In the old as well as the new continent, most of the waters have their greatest extent from west to east, and most of the rivers flow in this direction, which is caused by another reason, *i. e.* that there are many long chains of mountains parallel to each other, whose direction is from east to west, and because the rivers and other streams are obliged to follow the intervals which divide these chains of mountains; consequently, one single chain of mountains, directed from north to south, will produce rivers whose direction will be the same as that of those which issued from many chains of mountains, whose common direction is from east to west; and it is for this particular reason, that the rivers of America have this direction in common with those of Europe, Africa, and Asia.

This sweeping assertion of Buffon is, however, contradicted by the fact. That the rivers of Europe generally take the course which he mentions is undoubtedly true. But with respect to the other three quarters of the globe, the exceptions to his rule are numerous and important. In Asia, all the gigantic Siberian rivers flow from the south to the north. On the opposite side of that continent, the Donnai, the Menam, the Indus, and other mighty streams, descend from north to south. In Africa, the Nile directs its waters from the south to the north. In North America, the Mississippi, the most considerable part of the Missouri, and the Mackenzie; and, in South America, the Uruguay, the Parana, and the Araguay, take their course in the direction of the poles.

A remarkable phenomenon has been observed with respect to rivers, and that is, that in the inland parts, and at a distance from the sea, they flow in a direct line, but in proportion as they approach their mouths, they assume more of a winding or serpentine course.* In large rivers there is a considerable eddy along the banks; and the nearer the sea, the greater is this eddy. The surface of the water in rivers is by no means level from bank to bank;

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* The reason of this is probably that, as most rivers descend from mountains, they are more rapid near the source. On the contrary, when they descend into the plains, their course is known to be less rapid, and they are consequently diverted from a right line by every little obstacle which presents itself. The same reason will account for the different mouths of the Nile, the Ganges, &c. ED.

on the contrary, the middle of the stream is higher or lower than the water of the sides, according to circumstances. When a river swells suddenly by the melting of snow, or any other cause, the middle of the stream is sensibly higher than the sides: in one instance the elevation is said to have been as great as three feet. On the other hand, when rivers approach their mouths, the water near the sides is commonly more elevated than that in the middle.

The swelling of the Nile and its inundations has a long time employed the learned; most of them have looked upon it as marvellous, though one of the most natural things, and what is every year to be seen in every great river throughout the world. It is the rain which falls in Abyssinia and Ethiopia which causes the swelling and inundation of that river, though the north wind must be regarded as the primitive cause. 1st, Because it drives the clouds which convey this rain from the coast of Abyssinia; 2ndly, because blowing against the mouths of the Nile, it causes the waters to return against the stream, and thus prevents them from pouring into the sea in too great a quantity: this circumstance may be every year relied on, when the wind being at the north, and suddenly veering to the south, the Nile in one day loses what it gathered in four.

It has been calculated that the quantity of water which a river equally rapid with the Po, would convey to the ocean, would be in the proportion of a cubical mile in twenty-six days; and that all the rivers in the globe would, in the space of one hundred and twelve years, supply the sea with 21,372,626 cubical miles of water, which is about equal to its whole contents. Later estimates, however, and more worthy of credit, give only 25,000 cubic miles for the produce of all the rivers of the globe; in which case, supposing the ocean to be two miles in depth, 56,000 years would be required to fill its bed.

Mr. Halley has demonstrated that the vapours which rise from the sea,* and which the winds convey over the earth, are sufficient to form all the rivers, and to supply all the water which falls on the surface of the earth.

When the course of a river is interrupted by a precipice, it frequently forms a cataract or waterfall. The fail of Niagara, in the river St. Lawrence, in Canada, is the most famous in the world. The river, in the part just above the fall, is between six and seven hundred feet broad—the whole of this vast sheet of water is poured down the rocks, from the height of one hundred and fifty-three feet perpendicular. The noise of the fall is heard at several leagues distance; and the dashing produces a mist which reaches to the clouds, and which forms a most beautiful rainbow whenever the sun shines. Both the Rhine and the Nile have their cataracts. The river Vologda, in Russia, has two. The river Zaire, or Congo, in Africa, has a succession of rapids or cataracts. The river Velino, in Italy, has a cataract, artificially formed, of above a hundred and fifty feet perpendicular. At Trolhatta, near Gottenburgh, in Sweden, the river rushes down from a prodigious high precipice into a deep pit, with a terrible noise, and such dreadful force, that those trees designed for the masts of ships, which are floated down the river, are usually turned upside down in their fall, and often are shattered to pieces, by being dashed against the surface of the water in the pit; this occurs if the masts fall sideways upon the water; but if they fall endways, they dive so far under water, that they disappear for a quarter of an hour, or more: the pit into which they are thus plunged has been often sounded with a line of some hundred fathoms long, but no ground has hitherto been found. There is also a cascade, which descends three hundred and sixty feet, at Powerscourt, in Ireland. M. Buffon supposes this to be the highest in the world. It is, however, far surpassed by that of Tequendama, in South America, which falls nearly six hundred feet, and that of the Staubbach, in Switzerland, which falls nine hundred feet. In the latter instance, the sheet of water is completely broken by the resistance of the air, and the fluid reaches the earth like a shower of rain.

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* It is calculated that from a square foot of water, about one pint is evaporated in twenty-four hours; of this water, one part falls back into the sea, and another part is carried off in the form of clouds; these clouds are arrested by the tops of mountains, where they fall in the form of rain, &c. This rain sinks into the earth, and forms springs, rivulets, &c. which uniting, fall from the mountains in larger currents. Ed.

There are rivers which lose themselves in the sands, and others which seem to precipitate into the bowels of the earth: the Guadalquiver in Spain, the Rhone, the Orbe, and many others, lose themselves in the earth. It is asserted, that in the west part of St. Domingo, there is a mountain of a considerable height, at the foot of which are many caverns or subterraneous rivers, and the rivulets fall with so much noise as to be heard at the distance of seven or eight miles.

In the old continent there are about four hundred and thirty rivers, which fall directly into the OCEAN, or into the Mediterranean and Black Sea, and in the new continent, scarcely one hundred and eighty rivers are known, which fall directly into the sea: but in this number only the great rivers are comprehended. All these rivers carry to the sea a large quantity of mineral and saline parts, which they have washed from the different soils through which they have passed. The particles of salt, which are easily dissolved, are conveyed to the sea by the water. Some naturalists, and among the rest Halley, have pretended that the saltness of the sea proceeds only from the salts of the earth, which the rivers transport thither. Others assert, that the saltness of the sea is as ancient as the sea itself, and that this salt was created only that the sea might not corrupt: but it may be well supposed that the sea is preserved from corruption by the agitations of the wind, and the flux and reflux, as much as by the salt it contains; for when it is kept in a barrel, it corrupts in a few days, and Boyle relates that a mariner becalmed for thirteen days, found at the end of that time the sea so infected, that if the calm had not ceased, the greatest part of his people on board would have perished. The water of the sea is also mixed with a bituminous oil, which gives it a disagreeable taste, and renders it very unhealthy. The quantity of salt contained in sea water is about one-fortieth part, and the sea is nearly equally saline throughout, at the top as at the bottom, under the line, and at the Cape of Good Hope, although there are several parts, as on the Mosambique coast, where it is salter than elsewhere. It is also asserted not to be so saline under the arctic zone, which may proceed from the great quantity of snow, and the great rivers which fall into those seas, and because the heat of the sun produces but little evaporation there, in comparison of the evaporation in hot climates.

The ocean surrounds the whole earth without any interruption of continuity, and the tour of the globe may be made by passing the point of South America. Whether the ocean surrounds the northern part of the globe in the same manner is not yet fully ascertained; but recent discoveries afford the strongest reason to believe that such is the case. In consequence of the ice, however, all mariners who have attempted to go from Europe to China by the north-east or north-west, have alike miscarried in their enterprises.

The seas which are called MEDITERRANEAN, are proper branches from the great ocean, by which they are supplied. LAKES differ from the Mediterranean seas, because they do not receive any water from the ocean; for, on the contrary, if they have communication with the seas, they furnish them with water; thus the Black Sea, which some geographers have regarded as a connection with the Mediterranean, and consequently as an appendix to the ocean, is in reality only a lake; because, instead of receiving water from the Mediterranean, it supplies it with some, and flows with rapidity through the Bosphorus into the lake called the sea of Marmora, and thence through the strait of the Dardanelles into the Grecian Sea. The water of the Black Sea appears to be less clear, and much less saline than that of the ocean. No island is to be met with throughout this sea: tempests are very violent here, and more dangerous than in the ocean.

Next to the Black Sea, the greatest lake in the universe is the Caspian Sea, whose extent in length from north to south is about two hundred and fifty leagues, and scarcely more than eighty broad, on an average. This lake receives one of the greatest rivers in the world, i. e. the Volga; also some other considerable rivers, among which are the Yaik, the Yemba, the Daria and the Asterabad; but what is singular is, that it does not receive any on its eastern side throughout this whole length of nearly three hundred leagues. There are some small islands in the Caspian Sea, and its waters are much less saline than those of the ocean; storms are here very dangerous, and large vessels are not used for navigation therein, as it is shallow, and many banks and shoals are scattered under the surface of the water.

There are lakes which, like pools, do not receive any river, and from which none go out. There are others which do receive rivers, and from which others run; and lastly, some which only receive rivers. The Caspian Sea and the lake Aral are of the last species; they receive the waters of many rivers, and contain them. Thus the Dead Sea receives the Jordan, though no river goes from it. In Asia Minor there are small lakes of the same kind. Persia has several; some of which are of great magnitude. The largest is that of Zerah, or Durra, the *Aria Palus*, of the ancients, which has an extent of one thousand one hundred square miles, and receives not only several minor streams, but also the river Helmund, after a course of four hundred miles. The lake of Ourmia, in Adjerbidjan, is two hundred and eighty miles in circumference; and lakes Van, Erivan, and Baktegan, are likewise of considerable size. There are also similar small lakes in Greece and Albania, and there are some of the same kind both in Africa and America. That of Titicaca, in South America, has a circumference of two hundred and forty miles, and a depth of from seventy to eighty fathoms.

The most general and largest lakes, however, are those which having received another river, or many small rivers, give rise to other great rivers. It is worthy of remark that all lakes from which rivers derive their origin, all those which fall into the course of rivers, and which carry their waters thereto, are not saline; and almost all those, on the contrary, which receive rivers, without other rivers issuing from them, are saline: which seems to favour the opinion we have laid down on the subject of the saltness of the sea; for evaporation cannot carry off fixed salts, and consequently those which rivers carry into the sea, remain in it; and although river water appears to taste sweet, we well know that it contains a small quantity of salt, and in course of time the sea must have acquired a considerable degree of saltness, which must still continue increasing. It is thus, therefore, in all probability, that the Black Sea, the Caspian Sea, the lake Aral, the Dead Sea, &c. are become salt.

The most remarkable lake perhaps in the world, is the Dead Sea, the waters of which contain bitumen * as well as salt; this bitumen, which is called the *Bitumen of India*, is no other than the asphaltum, which has caused some authors to call this sea *Lake Asphaltum.* The land which borders on this lake contains a great quantity of bitumen, and many have applied the fables to this lake, which the poets feign of the lake Avernus, that no fish could live in it, and that birds which attempted to fly over it were suffocated: but neither of these lakes produce such mortal events; fish live in both, birds pass over them, and men bathe in them without the least danger. Such, indeed, is the specific gravity of the water, from the fluid holding in solution nearly one-fourth its weight of various salts, that it would be difficult for a man to sink in it. A petrifying lake in Ireland is also mentioned as remarkable; and the lake Neagh, in Ireland, has also the same property of apparently turning wood, &c. into stone; but these petrifications are no other than incrustations like those made by the water of Arcueil near Paris.

CHAP. III.

Of Winds, regular and irregular....Monsoons....Hurricanes....Whirlwinds....Waterspouts.

NOTHING is more irregular in our climates than the course of the WINDS. There are, however, countries where this irregularity does not exist, but where the wind blows constantly in one uniform direction.

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* Mineral pitch. ED.

The theory of the winds has been so well described by Mr. Maclaren and Mr. Leslie, that we will copy their words, in preference to the vague and far less accurate description which is given by the French naturalist. "The unequal distribution of heat over the surface of the land and water," says Mr. Maclaren, "necessarily disturbs the equilibrium of the atmosphere, and produces currents of air or winds. These currents, however various, have been supposed to result from two general movements, pervading the whole mass of the atmosphere. The heavy and cold air of the temperate regions having a tendency to displace the warm and rarefied air of the torrid zone, generates a current in each hemisphere towards the equator. To replace the air abstracted from the higher latitudes, an upper and counter current flows back from the equator to the pole; and thus the atmosphere, while it performs a constant revolution, tempers the extremes of climate, by transporting the cold of the frigid zone to the equator, and carrying back the heat of the equator to the frigid zone. These great south and north currents, which are to be considered as the *primary* winds, receive various modifications. The under current, which proceeds from the polar regions, having impressed upon it the slow rotatory motion of those regions, does not acquire in its journey the velocity of the parts it passes over. Instead, therefore, of proceeding along the meridian, it is deflected to the westward. It pursues this lateral course more and more as it approaches the torrid zone, and the impulse south and north being destroyed when the currents from the opposite hemisphere meet at the equator, the motion westward alone remains. This constitutes the well known trade wind, which blows from the east at the equator, from the north-east at the northern tropic, and the south-east at the southern. The upper and counter current again, carrying with it the rapid velocity of the equatorial regions, does not travel right along the meridian, but deviates more and more to the east as it advances; and when its progress towards the pole is stopped by the accumulation of air from the oppósite meridians, the motion eastward remains, and it settles into a west wind. Thus a constant east wind should prevail at the equator, and a constant west wind near the poles; but the latter, being primarily an upper current, may not be invariably felt as a west wind at the surface. It does not follow, however, that the upper and under currents preserve their relative situation over all the temperate zone. From the greater accumulation of air in the higher latitudes, and from variations of temperature produced by local causes, the upper current will often be beat down to the surface, and the lower current ascend. This interchange will take place occasionally at all parts of the temperate zone. Hence, in high latitudes, storms of wind, which mingle the warm upper current with the cold air below, always produce an increase of heat, as Captain Parry found.—In the northern hemisphere, then, when the cold current from the pole sweeps the surface rapidly, we have *north* wind; it becomes a *north-east* wind when its motion southward is retarded; an *east* wind when it is checked; and a *south-east* when it is deflected back, by mingling with a current from the south; all of which, except the last, are generally found to be cold winds. When the warm current from the south descends and sweeps the surface, we have a *south* wind, if its motion northward is rapid; a *south-west* when its motion northward is retarded; a *west* wind when it is checked; and a *north-west* when it meets and mingles with a current from the north. All these, except the last, are generally warm winds, as experience proves. The line of division between the upper and lower currents should be where the mercury stands at fifteen inches, which is at the height of three miles and a half. This should be the region of clouds, and clouds do generally approach to this elevation.

"The theory, upon the whole, agrees tolerably well with the facts. But the variable surface and temperature of the land greatly affect the course and velocity of the winds. In the torrid zone, within the parallel of twenty-five or thirty degrees on each side of the equator, the trade winds blow constantly from the east. From the superior warmth of the northern hemisphere, the line that separates the opposite trade winds is not the equator, but the second or third parallel north. To a certain extent also, they follow the course of the sun, reaching a little further into the south hemisphere, and contracting their limits in the north when the sun is on the south side of the equator, and making a reverse change when he declines to the north. In a zone of variable breadth, in the middle of this tract, calms and rains prevail, caused, probably, by the mingling and ascending of the opposite aerial currents. High lands change or interrupt the course of the trade winds. Thus, under the lee of the African shore, calms and variable winds prevail near the Cape Verd islands, while an eddy or counter current of air from the south-west is generated on the coast of Guinea. The lofty barrier of the Andes shelters the sea on the Peruvian shores from the trade winds, which are not felt till a ship has sailed eighty leagues to the westward; but the intervening space is occupied by a wind from the south. In the Indian Ocean the trade wind is curiously modified by the lands which surround it on the north, east, and west. The southern trade wind blows regularly from the east and south-east, from ten degrees of south latitude to the tropic; but in the space from ten degrees south latitude to the equator, north-west winds blow during our winter (from October to April), and south-west in the other six months; while, in the whole space north of the equator, south-west winds blow during summer, and north-east during winter. The cause of these remarkable winds, which are called monsoons, has not been very satisfactorily ascertained.

"The region of constant winds is confined within the thirtieth parallel on each side of the equator. On the outer side of these limits, calms prevail pretty generally over a narrow space, beyond which the region of variable winds extends to the pole. In the open sea, where the true direction of the winds is best known, navigators have repeatedly observed that throughout this region the prevailing wind is from the west. Mr. Forster observes, that beyond the tropics, the west winds are the most universal. That east winds have an ascendancy within the antarctic circle, as he thinks, may be questioned; few observations having been made there, and those few not to be depended on, in consequence of the local influence of the ice. According to the author of Lord Anson's Voyage, 'a westerly wind almost perpetually prevails in the southern parts of the Pacific Ocean' (he speaks of latitude sixty degrees) and a similar wind in the northern parts carried the Spanish galeons from Japan to California, along the parallel of thirty-five or forty degrees. West winds prevail in Kamtschatka; they blow three fourths of the year in Hudson's Bay; the west and north-west winds predominate greatly at Melville Island; and it is a familiar fact among mariners, that, by means of these winds, the voyage eastward across the North Atlantic is generally accomplished in about half the time of the voyage westward. On the west coast of Europe, too, the west and south-west winds are the most general. It is remarked, also, that in our climate, south and south-east winds are the most rare; that winds between north and east are almost invariably cold; those between north and west of a mixed character. So far the facts correspond generally with the theory, though many anomalous circumstances may be found.

"The change of the seasons, which affects the local temperature so much, necessarily influences the atmospheric currents. Accordingly, the most violent tempests are about the equinoxes, and in every country there are prevailing winds peculiar to certain seasons. It may be suspected that most of the winds observed on land or in confined seas are merely local eddies, or reflex currents, produced by the irregularities of the surface. Thus, while the south-west wind prevails almost one half of the year at Dover, London, and in the west of England generally, it is scarcely felt at Liverpool, which lies in the gorge of a valley, where the western chain of hills is interrupted; and on the other hand, the south-east, so uncommon in the rest of England, is the predominating wind here. In the long basin of the Red Sea, the wind blows in no direction but right up and down. In Lancaster Sound, Captain Parry found the wind to blow always either east or west. For ten months of the year a wind (which is probably a smaller branch of the north trade wind) blows constantly up the valleys of the Mississippi and Ohio, preserving a breadth in the latter of twelve or fifteen miles. In the list of *Vents Dominians* for the interior of Europe, collected by Cotte, nothing like a system can be discovered—nothing but local currents, running in every possible direction, according to the position of mountains and valleys. Winds, indeed, even when strong, are often confined to a space surprisingly small. In the temperate, but still more in the frigid zone, two or three winds are seen blowing from, or to, different points within a few leagues; nay, of two ships within sight of one another, one is sometimes becalmed, while the other is seen struggling with a storm. In the northern seas, even strong gales, when they have carried a ship into frozen water, invariably desert her, or give place to a wind which blows from the ice. The effect can only be attributed to the comparative coldness of the ice, and warmth of the water, generating a local descending current over the one, and an ascending current over the other.

"The Mediterranean has a system of winds peculiar to itself, which we have not room to explain. All warm countries, where sandy deserts abound, give birth to pernicious hot winds. Such is the Simoom or hot wind of the desert, and the Sirocco, so well known in the East, and along the shores of the Mediterranean."

With respect to the trade wind and monsoons, Mr. Leslie observes, that, "our northern hemisphere presenting to the action of the solar beams a larger surface of land than the southern, is, on the whole, rather warmer. Hence the parallel of greatest heat runs not exactly through the equator, but about three degrees farther north. This circle is therefore strictly the mean path of the aggregate easterly streams of air.

"But though the hottest part within the torrid zone, taking the average of a whole year, occupies the parallel of three degrees north latitude, it must to a certain extent shift its position with the seasons. In the summer months, the sun shines twice vertical upon the tropic of Cancer, and consequently raises the temperature of the northern half of the zone. During winter again, this effect is transferred to the southern half of the torrid region. In the progress of summer, therefore, the trade wind gradually bends about a point to the north; but as winter advances, it declines as much to the south.

"Such is the character of that general wind which encircles the globe, flowing with slight deviation constantly from the east, and spreading over a zone of more than fifty degrees in breadth. It sweeps the Atlantic Ocean from the coast of Africa to Brazil, and the Pacific from Panama to the Philippine Isles and New Holland, and again the Indian Seas partially from Sumatra to Zanguebar.

"The trade wind undergoes an essential modification, however, where the continent stretches into the torrid zone. The sun acting more powerfully upon the land than upon the surface of the sea, the accumulated warmth is much greater, and shifts with the revolution of the seasons on either side of the equator. The centre of heat approaches in summer to the northern, and in winter to the southern tropic. Instead of the great eastern stream, those regions have two opposite periodic winds alternating towards the north and the south, and called the *monsoons*. When these winds advance to the equator, they conjoin an apparent easterly velocity; but when they recede from the equator, they carry their excess of velocity from the west. A diagonal motion results from the combined tendencies. In the Arabian and Indian seas, on the north side of the equator, the monsoon blows north-west during the summer months, from April to October; and in the opposite direction, or south-east, during the winter. But on the south side of the equator, near Java and Sumatra, the course of the monsoon is north-east in summer, and south-west in winter."

The land and sea breezes, which fan the coasts and islands of hot climates, have been well described by Dampier, one of the most observant and intelligent of voyagers. "These sea breezes," says he, "do commonly rise in the morning about nine o'clock, sometimes sooner, sometimes later. They first approach the shore so gently, as if they were afraid to come near it, and ofttimes they make some faint breathings, and as if not willing to offend, they make a halt, and seem ready to retire. I have waited many a time both ashore to receive the pleasure, and at sea to take the benefit of it.

"It comes in a fine, small, black curl upon the water, when as all the sea between it and the shore not yet reached by it is as smooth and even as glass in comparison; in half an hour's time after it has reached the shore it fans pretty briskly, and so increaseth gradually till twelve o'clock, then it is commonly strongest, and lasts so till two or three a very brisk gale; about twelve at noon it also veers out to sea two or three points, or more, in very fair weather. After three o'clock it begins to die away again, and gradually withdraws its force till all is spent, and about five o'clock, sooner or later, according as the weather is, it is lulled asleep, and comes no more till the next morning.

"These winds are as constantly expected as the day in their proper latitudes, and seldom fail but in the wet season. On all coasts of the main, whether in the East or West Indies, or Guinea, they rise in the morning, and withdraw towards the evening; yet capes and headlands have the greatest benefit of them, where they are highest, rise earlier, and blow later.

"Land breezes are as remarkable as any winds that I have yet treated of; they are quite contrary to the sea breezes; for those blow right from the shore, but the sea breeze right in upon the shore; and as the sea breezes do blow in the day and rest in the night, so, on the contrary, these do blow in the night and rest in the day, and so they do alternately succeed each other. For when the sea breezes have performed their offices of the day, by breathing on their respective coasts, they in the evening do either withdraw from the coast, or lie down to rest. Then the land winds, whose office is to breathe in the night, moved by the same order of Divine impulse, do rouse out of their private recesses, and gently fan the air till the next morning; and then their task ends, and they leave the stage.

"There can be no proper time set when they do begin in the evening, or when they retire in the morning, for they do not keep to an hour; but they commonly spring up between six and twelve in the evening, and last till six, eight, or ten in the morning. They both come and go away again earlier or later, according to the weather, or some accidental cause from the land: for on some coasts they do rise earlier, blow fresher, and remain later, than on other coasts, as I shall show hereafter.

"These winds blow off to sea, a greater or less distance, according as the coast lies more or less exposed to the sea winds: for in some places we find them brisk three or four leagues off shore; in other places not so many miles, and in some places they scarce peep without the rocks, or, if they do sometimes in very fair weather make a sally out a mile or two, they are not lasting, but suddenly vanish away, though yet there are every night as fresh land winds ashore at those places as in any other part of the world.

"Indeed, these winds are an extraordinary blessing to those that use the sea in any part of the world within the tropics; for as the constant trade winds do blow, there could be no sailing in these seas; but by the help of the sea and land breezes, ships will sail two hundred or three hundred leagues, as particularly from Jamaica to the

Lagune of Trist, in the Bay of Campeachy, and then back again, all against the trade wind.

"The seamen that sail in sloops or other small vessels in the West Indies, do know very well when they shall meet a brisk land wind, by the fogs that hang over the land before night; for it is a certain sign of a good land wind to see a thick fog lie still and quiet, like smoke over the land, not stirring any way; and we look out for such signs when we are plying to windward. For if we see no fog over the land, the land wind will be but faint and short that night. These signs are to be observed chiefly in fair weather, for in the wet season fogs do hang over the land all the day, and it may be neither land wind nor sea breeze stirring. If in the afternoon also, in fair weather, we see a tornado over the land, it commonly sends us forth a fresh land wind.

"These land winds are very cold, and though the sea breezes are always much stronger, yet these are colder by far. The sea breezes, indeed, are very comfortable and refreshing; for the hottest time in all the day is about nine, ten, or eleven o'clock in the morning, in the interval between both breezes: for then it is commonly calm, and then people pant for breath, especially if it is late before the sea breeze comes, but afterwards the breeze allays the heat. However, in the evening again, after the sea breeze is spent, it is very hot till the land wind springs up, which is sometimes not till twelve o'clock, or after."

This phenomenon is thus accounted for by Mr Leslie. "In open seas, and especially near the equator, the thermometer scarcely varies a degree, and very seldom two degrees, by Fahrenheit's scale, in the whole course of a day. But on the land the change of temperature between the night and day, in similar situations, will rise often higher than seventy-six centesimal degrees, or one hundred and twenty-six of Fahrenheit. If we therefore conceive a stratum of air two thousand feet in altitude, heated only to the mean difference, or three centesimal degrees, it would receive an expansion of twenty-four feet; whence the velocity of the wind produced would be thirty-nine feet every second, or at the rate of twenty-six miles in the hour. This is a very moderate estimate; but the celerity of the current must, no doubt, be diminished from the retardation which it suffers in proportion to the length of track over which it has to sweep.

" During the night the lower atmosphere is colder on land than at sea, owing partly to the descent of the more elevated and colder portions of air which chill the surface of the ground, and partly to those cold pulses which are incessantly darted from every point of the azure sky. If we reckon the reduced temperature of the land only a centesimal degree and a half below the standard of the adjacent ocean, this would give twelve feet for the contraction of the vertical column of air and, consequently, a stream would flow towards the sea with a celerity of twenty-eight feet per second, or very nearly twenty miles every hour. In general, the land breeze may be considered not so powerful as that which blows from the sea."

The winds (says Buffon, to whom we now return) are more violent in mountainous places than in plains; and the higher we ascend, the more the power of the wind increases, until we reach the common height of the clouds; that is, to about one quarter or one third of a league perpendicular: beyond that height, the sky is generally serene, especially in summer, and the wind is said to be even imperceptible on the tops of high mountains.

A current of air, like a current of water, increases in velocity, where the space of its passage is straitened; the wind which is scarcely perceptible in a wide and open plain becomes violent in passing through a narrow passage between two mountains, or simply between two lofty buildings; and the point of the most violent action of the wind is above these structures or mountain straits. The air, being compressed by the resistance of these obstacles, has a greater mass of density, and the same velocity subsisting, the effort or gust of wind becomes much stronger; this is the cause that near a church, or a castle, the winds seem to be much stronger than they are at a certain distance from these edifices. It has been often remarked, that the wind being reflected by an insolated building does not prevent it from being more violent than a direct wind, which produced this reflected wind; for this we are able to discern no other reason than the above: the impelled air compresses against the building, and is reflected, not only with its former velocity, but also with a greater body, which, in fact, renders its action much more violent. Particular winds, whether direct or reflected, are more violent than those which are general. A uniformly continued stream of air produces not such havock as the fury of those winds which blow in sudden gusts.

The Cape of Good Hope is famous for its tempests, and the singular cloud which produces them: this cloud appears at first only like a small round spot in the sky, called by the sailors *the Ox's Eye*, and which probably appears so minute from its exceeding great height. In Natolia a small cloud forms like the Ox's Eye at the Cape of Good Hope, and from this cloud issues a terrible wind, which produces similar effects.* In the sea between

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* The cause of the wind which succeeds the appearance of the cloud

Africa and America, especially under the equator and in the neighbouring parts of it, these kinds of tempests very often arise: near the coasts of Guinea sometimes three or four of these storms are formed in a day; they are caused and announced, like those of the Cape, by small black clouds: the rest of the sky is generally very serene, and the sea calm. The first blast which proceeds from these clouds is furious, and would sink ships in open sea, if they did not take the precaution to furl the sails. It is principally in the months of April, May, and June, that these tempests are experienced on the Guinea sea.

All these tempests are produced by winds which proceed from a cloud, and their direction is either to the north or south, north-east or south-west, &c.; but there are others called HURRICANES, which are still more violent than these, and in which the winds seem to proceed from all the coasts; they have a whirling motion which nothing can resist. A calm generally precedes these horrible tempests, and the sea then appears like a piece of glass; but in an instant the fury of the winds raises waves as high as the clouds. There are parts where we cannot land, because alternately there are always calms and hurricanes of this kind: the Spaniards have, therefore, called these places *calms* and *tornados*.

The following table shows the velocities of the different winds, from one mile in an hour, when the motion is

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seems to be the rarefaction of the air caused by the discharge of electrical matter from the cloud. In the hot climates these black clouds are known to be highly charged with electricity, and the electric fire, being in this respect analogous to other fire and heat, produces an immediate rarefaction of the air. This rarefaction produces a kind of vacuum, and the cold dense air rushing in, a tempest naturally ensues. EDITOR.

scarcely perceptible, to one hundred miles, which is the speed of the destructive hurricane.

Miles per hour.	Feet per second.	
1	1.47	
2	2.93	Light airs.
3	4.40	
4	5.87	Breeze.
5	7.33	
10	14.67	Brisk gale.
15	22.00	
20	29.34	Fresh gale.
25	36.67	
30	44.01	Strong gale.
35	51.34	
40	58.68	Hard gale.
45	66.01	
50	73.35	Storm.
60	88.02	
80	117.36	Hurricanes tearing up trees, overturning buildings, and almost every other obstacle.
100	146.70	

When from a sudden rarefaction, or any other cause, contrary currents of air meet in the same spot, a Whirlwind is produced. Dr. Franklin gives an account of the formation and progress of one of these meteors, which he witnessed in Maryland, while travelling with his son. "In a valley below us," says he, "we saw a small whirlwind, which began in the road and which drew attention by the dust that it raised and contained. It appeared like a sugarloaf, lengthened at the point, which ascended to us along the hill, increasing in size as it advanced. When it passed near us, its smaller end, which was next the ground, did not appear bigger than a common barrel; but it grew so large towards the summit, that at the height of forty or fifty feet it seemed to be twenty or thirty feet in diameter. The rest of the company stopped to look at it; but, as my curiosity was stronger than theirs, I followed it closely, and observed that, on its passage, it licked up, if I may use the expression, all the dust which was beneath its lower end. As it is a popular opinion that a shot fired at a waterspout will make it burst, I endeavoured to break this small whirlwind by striking it repeated blows with my whip, but to no purpose. In a short time, it quitted the road, and entered the wood, where it every moment became larger and stronger, carrying away, instead of dust, the dry leaves with which the ground was thickly strewed, and making a great noise between those leaves and the branches of trees, bending and turning large trees circularly with astonishing force. Though the progressive motion of the whirlwind was not so fast but that a man on foot might easily keep up with it, yet its circular motion was astonishingly rapid. The leaves with which it was then filled enabled me to perceive distinctly that the current of air that drove them ascended from below to above in a spiral line, and when I looked at the trunks and bodies of great trees which the whirlwind had enveloped as it passed on, and which had left it entire, I was no longer astonished that my whip could produce no effect on it. I followed it nearly three quarters of a mile, till some dead branches of trees, broken by the whirlwind, flying in the air, and falling around me, made me apprehensive of danger. I therefore stopped, and contented myself with watching the head of it during its progress, the leaves which it bore with it rendering it visible at a great height above the trees. The major part of these leaves, escaping freely from the upper and widest part of the whirlwind, were dispersed by the wind; but they were at such an elevation in the air that they did not seem larger than flies. My son followed the whirlwind through the wood, on quitting which it crossed an old tobacco plantation, where, finding neither leaves nor dust to carry away, the lower part of it became nearly invisible, and at length it entirely disappeared above this field." This meteor moved in a direction almost opposite to the prevailing wind, and not in a straight line; and its velocity was not uniform, as it seemed occasionally to be stationary for a few seconds, and then to rush forward with increased speed.

It is not always, however, that whirlwinds are thus harmless. They are often combined with electrical phenomena, in which case they scatter destruction over a considerable extent of country. France, particularly in the south, has often suffered from their violence. In August, 1823, one of them, of great magnitude, ravaged the neighbourhood of Anet, in the department of the Eure and Loire. It extended from the clouds to the ground, and was formed of a thick and blackish vapour, in the midst of which flames frequently appeared in various directions. Rushing furiously forward, it rooted up and broke seven or eight hundred trees within the space of a league, and then fell impetuously on the village of Marchefroy. Half the houses of the village were destroyed in an instant; the walls were prostrated on all sides, and the roofs were torn off, and carried to the distance of half a league, by the irresistible impulse of the aerial torrent. At the same time the meteor discharged a shower of hailstones, several inches in diameter, which broke to pieces heavily laden wagons, and destroyed every vestige of the harvest. A still more terrific visitation of this kind was experienced in August, 1826, in the department of the Aude. About noon, the clouds began to gather in the west, a violent wind arose, and a black and thick cloud appeared suspended over a spot called the Red Field. On the side of Fombraise, the clouds were seen to rush against each other, and to descend very low, as if they were attracted by the earth. The thunder echoed from all parts; a dead rolling sound was heard; and all the domestic animals fled to shelter. All at once a frightful cracking was heard in the west; the air, violently agitated, was drawn with extreme rapidity towards the opake cloud which covered the Red Field. The moment of their junction was marked by a loud explosion, and the appearance of a column of fire, which, sweeping along the field, rooted up every thing in its course. A young man, who was unfortunate enough to be in the path of the meteor, was whirled into the air, and fractured his skull by falling on a rock. Fourteen sheep were also snatched up, and fell suffocated. The column of air and fire then proceeded to the castle of Laconette, threw down the west wall of the park, made two excavations, removed enormous rocks, rooted up the largest trees, and penetrated into the castle in two places, where it committed the most terrible devastation. After having thus ravaged a considerable extent of country, it finally disappeared, leaving the ground deeply furrowed, and the air strongly impregnated with a sulphureous odour.

The same effect that is produced by two contending currents of air takes place in another element, and gulfs or whirlpools are no other than the eddies of the water formed by the action of two or more opposite currents. The greatest known gulf is that of the Norway sea, called Maalstroem, or Moskostroem, which is affirmed to be upwards of twenty leagues in circuit. It absorbs for six hours all that is near it, water, ships, &c. and afterwards returns them in the same space of time as it drew them in.

A **Waterspout** is no other than a whirlwind at sea. The vacuum which is caused by the meeting currents causes the water to rise up in the form of a cylinder, or rather of an inverted cone. In the travels of M. Thevenot there is a very minute and circumstantial account of the formation of a waterspout.

"The first," says this celebrated voyager, "which appeared to me was on the northern coast, between us and the island Quesomo, at a gunshot from the ship; the head of the ship was then to the north-east: we directly perceived water which boiled on the surface of the sea about a foot high; it was whitish, and appeared above that height like a thick smoke, so that it properly resembled some burning straw, which only smoked; it made a noise like that of a torrent which runs with much rapidity in a deep valley: but this noise was mixed with a clearer, similar to the strong hissing of serpents or vipers; a little while afterwards we perceived something like a dark canal, which bore a strong resemblance to a smoke which ascends towards the clouds, turning round with great velocity: this appeared about the thickness of my finger, and the same noise still continued; the duration of this spout was no longer than about half a quarter of an hour: this over, we perceived another on the south side of us, which began in the same manner as the preceding: and almost as soon, a similar one made its appearance on the west side; and directly after a third by the side of the second; the farthest of the three might be about a musket-shot distance from us: they all three appeared like burning heaps of straw, a foot and a half or two feet high. We afterwards saw as many canals, which descended from the clouds on those places where the water was raised up, and each of them was as broad at the end fastened to the cloud, as the broad end of a trumpet, and resembled the human breast or that of an animal, drawn perpendicularly down by a heavy weight; these canals appeared of a darkish white, and were not straight, but crooked in some places ; they even were not perpendicular ; but on the contrary, from the clouds where they were joined to the parts which drew in the water, they were very much bent; and what is more particular is, that having been driven by the wind, this canal followed it without breaking or quitting the place where it drew in the water, and passing behind the first canal, they were sometimes crossed like a St. Andrew's Cross. At the beginning they were all three about the thickness of my finger, but afterwards the first of the three increased considerably: but the last which was formed scarcely remained longer than that which we saw on the north side. The second on the south side remained about a quarter of an hour, but the first on that side remained a little longer, and this it was which terrified us the most. At first its canal was as thick as my finger, afterwards as thick as my arm, then as my leg, and at last as the trunk of a large tree, which a man might compass with his arms. We distinctly perceived water through this transparent body, which ascended in a serpentine manner. Sometimes it diminished a little in size, sometimes at top and sometimes at bottom; then it resembled exactly a soft tube, with some fluid matter pressed with the fingers, either upwards to make this liquor descend, or at bottom, to cause it to ascend. After this it diminished so much that it was thinner than my arm; afterwards it returned as thick as my thigh, and then again became very thin; at last, I saw that the water elevated on the surface of the sea began to lower, and the end of the canal which touched it divided and grew narrower, when a variation of the light removed it from our view."

CHAP. IV.

Of Volcanoes...Earthquakes...the Formation of new Islands... Caves and Grottoes...Bogs and Fens...Mutations of Land into Sea, &c.

THE burning mountains called VOLCANOES include in their bowels sulphur, bitumen, and other matters which serve as aliment to a subterraneous fire, the effect of which is far more violent than that of gunpowder, or even thunder. A volcano is a cannon of immense volume, the orifice of which is often more than half a league in circumference: this mouth vomits forth torrents of smoke, flames, rivers of bitumen, sulphur, and melted metal, clouds of cinders and stones, and sometimes it ejects enormous rocks to many leagues distance, which human powers united could not move; the combustion is so terrible, and the quantity of burnt and melted matters which the mountain throws out is so plentiful, that they enter cities, forests, cover the fields a hundred and two hundred feet in thickness, and form sometimes hills and mountains, which are only heaps of these ejected matters. The action of this first fire is so great, the force of explosion so violent, that its reaction has been known to shake and move the earth, agitate the sea, overthrow mountains, and destroy the most solid towns and edifices, even to very considerable distances. The natives of Iceland imagine that the roarings of the volcano are the cries of the damned, and its eruptions the effects of the rage and despair of these unhappy wretches.

Malte Brun has described with equal accuracy and spirit the circumstances of volcanic eruptions. "The eruption of a volcano (says he) is a most frightful and most majestic phenomenon. The signs which are the forerunners of the explosion announce that the invisible combat of the enraged elements has already commenced. These are, violent movements, which shake the earth afar off, prolonged bellowings, subterraneous thunders, which roll in the sides of the agitated mountain. Very soon the smoke, which is almost continually emitted from the mouth of the volcano, increases, thickens, and ascends, under the form of a black column. The summit of this column, yielding to its own weight, sinks down, becomes rounded, and presents itself under the appearance of the head of a pine tree, having the lower part for its trunk. This hideous tree does not long remain immoveable: the winds agitate its blackened mass, and disperse it in branches, which form so many trains of clouds. At other times the scene opens with more brilliancy. A stream of flame rises beyond a collection of clouds, keeps immoveable for some time, and then appears like a pillar of fire which rests upon the ground, and threatens to set the sky in a blaze. A black smoke environs it, and from time to time intercepts the dazzling brightness. A number of lightnings appear to flash from the burning mass. On a sudden, the brilliant cascade seems to fall back into the crater, and its fearful splendour is succeeded by profound darkness. The effervescence, however, goes on in the interior abysses of the mountain; ashes, dross, and burning stones are projected in diverging lines, like the spouts of fireworks, and fall around the mouth of the volcano. Enormous fragments of rocks appear to be heaved against the skies by the arms of the new Titans. A torrent of water is often thrown out with impetuosity, and rolls hissing over the inflamed rocks. There is then raised from the bottom of the crater a liquid and burning matter, similar to metal when in fusion. This fills the whole of the crater, and reaches to the very edges of the opening. An abundant quantity of dross floats on its surface, which alternately appears and vanishes, as the liquid mass rises or falls in the crater where it seems to boil. This scene, of so majestic a character, is but the prelude to real disasters. The liquid matter overflows, runs down the sides of the volcano, and descends to its base. There it sometimes stops, and appears like a fiery serpent recoiling upon itself. More frequently it dilates itself, and gushes out from beneath a kind of solid crust which is formed upon its surface: it advances like a large and impetuous river, destroys whatever it meets within its course, flows over those obstacles which it cannot overturn, passes along the ramparts of the shaken cities, invades a space of country of several leagues in extent, and in a moment transforms flourishing fields into a burning flame. Equal ravages may be sustained, though the liquid matter, called *lava*, does not issue exactly from the top of the volcano: it is sometimes too compact and weighty to be elevated to the summit; its violent efforts then occasion new ruptures in the side of the mountain, through which rushes forth the igneous torrent."

In Europe are four famous volcanoes, Mount Etna in Sicily, Mount Hecla in Iceland, Mount Vesuvius in Italy, near Naples, and Stromboli, one of the Lipari islands, on the Italian coast. Mount Etna has burnt from time immemorial; its eruptions are very violent, and the matters it throws out are so plentiful, that they may be dug to the depth of sixty-eight feet, where we meet with marble pavement, and the vestiges of an ancient town which has been covered and buried under the thickness of matter thrown out from the mountains, in the same manner as the city of Herculaneum has been covered by the matter thrown out from Vesuvius. New mouths of fire were formed in 1650, 1669, and at other times. We see the flame and smoke of this volcano from Malta, which is about sixty leagues distance from it. In 1537, there was an eruption of this volcano, which caused an earthquake in Sicily for twelve days, and which overthrew a very great number of houses and structures: it ceased only by the opening of a new mouth, which burnt every thing for five miles in the environs of the mountain. The cinders thrown out by the volcano were so abundant, and ejected with so much force, that they were driven as far as Italy; and vessels which were departed to some distance from Sicily, were incommoded by them. Fazelli describes the conflagrations of this mountain circumstantially, and says the foot of it is one hundred leagues in circumference.

This volcano has now two principal mouths, the one narrower than the other: these two vents always smoke, but fire is never seen to issue from them, except during the time of eruptions: it is affirmed that stones are found which the volcano has thrown out to the distance of sixty thousand feet.*

One of the most violent eruptions of Mount Vesuvius was in the year 1737. The mountain vomited, by several mouths, large torrents of burning metallic matters, which dispersed themselves over the country and into the sea. Mons. Montesquieu, who communicated this relation to the Academy of Sciences, observed with horror one of these rivers of fire, and saw its course for six or seven miles till it reached the sea; its breadth was sixty or seventy feet, its depth twenty-five or thirty palms, and in certain bottoms or valleys, two hundred and twenty: the matter which flowed was like the scum which issues from the furnace of a forge. Since then several eruptions, of great violence, have occurred, particularly in 1767, 1794, and 1810. Next to those of the years 79 and 1631, that of 1794 was the most destructive. It flowed over five thousand acres of vineyards and cultivated lands, and destroyed the town of Torre del Greco. During this eruption, the summit of the mountain fell in.

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* See an interesting description of this celebrated mountain in an elegant and entertaining production entitled "The present State of Sicily and Malta."

Stromboli, which rises to an altitude of three thousand feet, is remarkable for being in a state of incessant activity, yet never throwing out those torrents of lava which descend from other volcanoes. Its perpetual flames have acquired for it the name of the light-house of the Mediterranean. The mountain is bifurcated, and the crater is situated at some distance from the summits. Spallanzani visited it in 1788, and has accurately described the phenomena which he witnessed. After having attentively examined the crater from one of the summits, he approached the crater, where he found that the explosions succeeded each other so rapidly, that they might almost be said to occur without any intervals of quiet; but they varied in their force, the matter in some instances not rising more than fifty feet, and falling again into the crater, and in others it was elevated half a mile: the sounds, consequently, are proportionably loud, or the reverse, and resemble a hissing noise; the fragments of lava were actually fluid during their progress, which was evident from their globular shape, and, becoming hard before they fell upon the sides of the mountain, that form is preserved.

The exhalations exhibited a thick cloud several miles in extent, and were strongly impregnated with sulphur; this cloud was impenetrable by the beams of the sun, and appeared very black in the midst, but white on the edges, and was, in all probability, a mile in depth. The vapour thus floating from the mountain was derived from three distinct sources, though doubtlessly produced by the same cause in the first instance: when an ejection of lava took place, it was always accompanied by a cloud of gray smoke from the crater; to the west of that spot were a number of obscure apertures, each of which sent forth a volume of similar vapour; and to the east, a vast cavern emitted a column at least twelve feet in diameter, extremely black and dense.

"Not satisfied with the observations I had already made," observes Spallanzani, "my curiosity impelled me to attempt farther discoveries. From the pointed rock on which I stood, I could only see the edges of the inside of the crater; I considered, therefore, whether it might not be possible to obtain a sight of the lower parts likewise; and, looking round me, I perceived a small cavern hollowed in the rock, very near the gulf of the volcano, into which the rock above prevented the entrance of any burning stones, should they be thrown so far. It was likewise so elevated, that from it the crater was open to my view. I therefore hastened to take my station in this cavity, taking advantage of one of the very short intervals between the eruptions. To my great satisfaction, my expectations were completely fulfilled; I could here look down into the very bowels of the volcano, and truth and nature stood as it were unveiled before me."

The crater he found to be of a circular form, with edges composed of a chaos of sand, scoriæ, and lava; and he imagined the circumference to be about three hundred and forty feet. Like all other craters, that of Stromboli assumes the shape of a truncated inverted cone, the sides of which, from east to south, were gently inclined, but the remainder very steep. Many parts of this internal descent appeared to be incrusted with yellow substances, which he supposed to be either the muriate of ammonia, or sulphur.

Fluid lava, resembling melted brass, red hot, and liquid, filled the crater to a certain height, and this matter appeared to be influenced by two distinct impelling powers, the one whirling and agitated, and the other upwards; at times it rose rapidly, and when the surface had reached within thirty feet of the edges of the crater, an explosion took place like a short clap of thunder, and, at the same instant, a portion of the lava was hurled with inconceivable swiftness into the air, which was as instantaneously separated into numerous fragments, and those were accompanied by a copious discharge of sand, ashes, and smoke. Immediately before the eruption occurred, the lava appeared inflated, and large bubbles, some several feet in diameter, rose and burst, the detonation followed, and the lava sunk, till a repetition of the operation was commenced; during the rising, a sound issued from the crater like that produced by a liquid boiling violently in a caldron. Many of the eruptions were so inconsiderable, that this effect could not be visible at a small distance from the mountain; in those the fragments constantly fell back to the gulf, with a sound, on their collision with the great mass of matter, similar to that produced by water when forcibly struck with flat staves; in the greater explosions, many of the pieces returned into the crater, some falling on the sides and rolling down, but many descended a precipice, formed by one side of the mountain, to the sea.

The pieces of scoriaceous lava, as they moved in the air, retained their red hot appearance, though the sun shone clear; many of them came in contact during their progress, and, according to the degree of heat they possessed, they adhered together, or were broken. The smoke seemed to be foreign to the lava, as none attended the fragments thrown into the air, and that which escaped passed through fissures, and at the moment the lava burst. According to Spallanzani's conjectures, the crater may be about twenty-five or thirty feet in depth, when the lava is raised to its greatest height, and upon its subsiding, forty or fifty. There are no visible marks of its having overflowed so as to descend like those of Etna and Vesuvius.

Though the ejections of the larger and heavier stones have short intermissions, those of the lesser and lighter have scarcely any. Did not the eye perceive how these showers of stones originate, it would be supposed that they fell from the sky: the noise of the more violent eruptions resembling that of thunder, and the darkness occasioned by the mounting cloud of smoke, presenting the image of a tempest.

While the naturalist was employed in intense observation, the eruption suddenly ceased, the lava sunk to a greater depth than usual, and remained thus depressed; the fierce light subsided, and, at the same instant, the various streams of smoke, issuing before silently from the apertures west of the crater, began to rush forth with a loud hissing noise, and the apertures to shine with a bright colour of fire. "I know nothing," says Spallanzani, "to which the sound produced by the issuing of these fumes can be more properly compared than the blowing of large bellows into a furnace by which metals are melted; such as I have seen at Zalatna, in Transylvania, and Schemnitz and Kremnitz, in Hungary; except that those volcanic bellows roared a hundred times louder, and almost deafened the ear."

Violent as are the eruptions of Ætna and Vesuvius, they are far surpassed by those of the volcanoes of Iceland. Hecla, which has an elevation of above five thousand feet, is the most famous of the Icelandic burning mountains; but there are many other volcanoes which more than rival it in the same island. Not above one third of the eruptions which have taken place in Iceland have been from Hecla.

One of the most tremendous of these visitations occurred in 1783, and in the province of Skapterfial. The flames were seen to the distance of two hundred and forty miles, and the lava covered a space, ninety miles long 72. 42 and forty-two broad, to the depth of from sixteen to twenty fathoms, and dried up twelve rivers, some of them of considerable magnitude.

" A vast chain of ignivomous mountains," says Malte Brun, " stretches around the great ocean. Terra del Fuego, Chili, Peru, all the chain of the Andes, are full of volcanoes. We distinguish in Peru, those of Arequipa and of Pichinca, and that of Cotopaxi, whose flames, in 1738, rose higher than two thousand feet, and whose explosion 360 m was heard at the distance of one hundred and twenty leagues, if we may give credit to the Spaniards. Chimborazo, one of the highest mountains of the globe, is an extinguished volcano, and there are a great many others. Humboldt has seen the smoke of Antisani rise eighteen thousand feet. If we pass the isthmus of Panama, we find the volcanoes of Nicaragua and of Guatimala. Their number is infinite: there are some which are covered with perpetual snow, and which consequently are elevated to a great height.—Then come those of Mexico, properly so called; namely, Oribaza, Popocateipetl, sixteen thousand six hundred and twenty-six feet high; Jorullo, which first broke out in 1759; and several others, all situated under the nineteenth parallel of latitude. California contains five volcanoes, that are now burning. There can be no doubt, according to the accounts of Cook, La Perouse, and Malaspina, that there is a number of very considerable volcanoes on the north-west of America. Mount Saint Elias is nearly sixteen thousand eight hundred feet in height. These volcanoes form the intermediate link between those of Mexico and those in the Aleutian islands and the peninsula of Alaschka. These last, which are very numerous, both extinct and burning, serve to continue the chain towards Kamtschatka, where there are three of great violence. Japan has eighty; and the island of Formosa has several. The volcanic belt now becomes immensely wide, and embraces the Philippine islands, the Marian or Ladrones, the Moluccas, Java, Sumatra, the isles of Queen Charlotte, the New Hebrides, and, in short, all that vast Archipelago which forms the fifth part of the globe.

"The other volcanic chains are far from being of so great extent. There is perhaps one in the Indian Sea. The islands of Saint Paul and Amsterdam, the formidable volcano in the isle of Bourbon, and the jets of hot water in the island of Madagascar, are the only known links of this chain.

"The middle of the Atlantic Ocean conceals another volcanic focus, of which the Azores and Canary islands have felt the effects. The Peak of Teneriffe, which is eleven thousand four hundred feet in height, is the most elevated volcano in the old world. It is very probable that Lisbon has, in its vicinity, a submarine volcano.

"The Antilles probably contain a whole system of volcanoes, parts of which are recognised in Jamaica, Guadaloupe, and Grenada."

Among the volcanoes existing in the Indian Archipelago, one of the most formidable is that of Mount Tanbora, in the island of Sumbawa. In April, 1815, there was an eruption of it, which destroyed several thousand persons, and desolated such a wide extent of territory that multitudes were compelled to emigrate to obtain subsistence. The mountain also threw out incessant showers of dust, which, in the middle of day, produced midnight darkness over an extent of several degrees.

But, perhaps, the most tremendous proof on record of the power of volcanic fire, is the eruption which gave birth to the volcano of Jurillo, in New Spain. The spot where this phenomenon occurred was one of the most extensive and rich estates in the country. "In the month of June, 1759," says Humboldt, "a subterraneous noise was heard. Hollow noises of a most alarming nature were accompanied by frequent earthquakes, which succeeded one another for from fifty to sixty days, to the great dismay of the inhabitants of the plantation. From the beginning of September, however, every thing seemed to announce the complete reestablishment of tranquillity, when, in the night of the 28th, the horrible subterraneous noise recommenced. The affrighted Indians fled to the mountains of Aguasarco. A tract of ground from three to four miles in extent, which goes by the name of *Malpays*, rose up in the shape of a bladder. The bounds of this convulsion are still distinguishable in the fractured strata. The Malpays, near its edges, is only thirty-nine feet above the old level of the plain called the *Playas de Jurillo;* but the convexity of the ground thus thrown up, increases progressively towards the centre, to an elevation of five hundred and twenty-four feet.

"Those who witnessed this great catastrophe from the top of Aguasarco, assert that flames were seen to issue forth for an extent of more than half a square league, that fragments of burning rocks were thrown up to prodigious heights, and that, through a thick cloud of ashes, illumined by the volcanic fire, the softened surface of the earth was seen to swell up like an agitated sea. The rivers of Cuitamba and San Pedro precipitated themselves into the burning chasms. The decomposition of the water contributed to invigorate the flames, which were distinguishable at the city of Pascuaro, though situated on a very extensive table land, four thousand five hundred and ninty-two feet elevated above the plains of Jorullo. Eruptions of mud, and especially of strata of clay, enveloping balls of decomposed basaltes in concentrical layers, appear to indicate that subterraneous water had no small share in producing this revolution. Thousands of small cones, from six feet to nine feet in height, called by the natives *ovens*, issued forth from the *Malpays*. Although within the last fifteen years, according to the testimony of the Indians, the heat of these volcanic ovens has suffered a great diminution, I have seen the thermometer rise to two hundred and two degrees of Fahrenheit, on being plunged into fissures which exhale an aqueous vapour. Each small cone is a *fumorola*, whence a thick vapour ascends to the height of from thirty to fifty feet. In many of them a subterraneous noise is heard, which appears to announce the proximity of a fluid in ebullition.

"In the midst of the ovens, six large masses, elevated from one thousand three hundred and twelve to one thousand six hundred and forty feet each above the old level of the plains, sprang up from a chasm, of which the direction is from the north-north-east to the south-south-east. This is the phenomenon of the Monte Novo of Naples, several times repeated in a range of volcanic hills. The most elevated of these enormous masses, which bears some resemblance to the *puys* of Auvergne, is the great volcano of Jorullo. It is continually burning, and has thrown up from the north side an immense quantity of scorified and basaltic lavas, containing fragments of primitive rocks. These great eruptions of the central volcano continued till the month of February, 1760. In the following years, they became gradually less frequent. The Indians, frightened at the horrible noises of the great volcano, abandoned at first all the villages situated within seven or eight leagues distance of the plains of Jorullo. They became gradually, however, accustomed to this terrible spectacle; and having returned to their cottages, they advanced towards the mountains of Aguasarco and Santa Ines, to admire the streams of fire discharged from an infinity of great and small volcanic apertures. The roofs of the houses of Queretaro were then covered with ashes, at the distance of more than forty-eight leagues in a straight line from the scene of the explosion. Although the subterraneous fire now appears far from violent, and the Malpays and the great volcano begin to be covered with vegetables, we nevertheless found the ambient air heated to such a degree by the action of the small ovens, that the thermometer, at a great distance from the surface, and in the shade, rose as high as one hundred and nine degrees of Fahrenheit. This fact appears to prove that there is no exaggeration in the accounts of several old Indians, who affirm, that for many years after the first eruption, the plains of Jorullo, even at a great distance from the scene of the explosion, were uninhabitable, from the excessive heat which prevailed in them."

Numerous as are the volcanoes which are still in action, they are, perhaps, outnumbered by those which have long been extinct. Italy, Dalmatia, Germany, and many other countries, contain many of the latter class. The southern provinces of France, particularly Auvergne, are full of extinguished volcanoes.

Humboldt is of opinion, that the influence of subterraneous fire, though bounded within comparatively narrow limits on the surface, extends, in the bowels of the earth, to immense spaces. In proof of this, he states that, on the day when the volcano of St. Vincent's, in the West Indies, broke out again, the sound of the explosions was conveyed under ground as far as the confluence of the rivers Nula and Apuré, a distance of nearly six hundred and fifty miles in a straight line, and was so loud as to resemble frequent discharges of the largest cannon.

The matters which volcanoes throw out, generally come forth in the form of a torrent of melted minerals, which inundates all the environs of these mountains; these rivers of flaming melted matters extend even to considerable distances, and by cooling, form horizontal or inclined strata, which for position are like the strata formed by the sediment left by the waters; but it is very easy to distinguish the strata produced from matters thrown out by volcanoes, from those which have the sediment of the sea for their origin. 1. Because these strata are not throughout of an equal thickness: 2. Because they contain only matters which are evidently perceived to have been calcined, vitrified, or melted, and because they do not extend to any great distance. When coal mines are opened, which are generally met with in argillaceous earth (clay), at a great depth, it sometimes happens that these matters have taken fire; there are even mines of coal in Scotland, Flanders, &c. which have burnt for a number of years. The communication of the air suffices to produce this effect, but those fires which are lighted in these mines, produce only slight explosions, and do not form volcanoes,* because all being solid and full in these places, fire cannot be excited, like that of volcanoes, in which there are cavities and void places where the air penetrates, which must necessarily extend the conflagration and augment the action of the fire, to the point in which we see it when it produces the terrible effects we have spoken of.

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* The inflammable air is detached or exhaled in amazing quantities in certain places. There was formerly a burning well near Wigan, in Lancashire; and another at Brosely, which is now stopped up; the vapour of which, when a candle was brought within about a foot of the surface of the water, caught flame like spirits of wine, and continued blazing for several hours after. Of this kind, also, are the perpetual fires in the kingdom of Persia. In that province, where the worshippers of fire hold their chief mysteries, the whole surface of the earth, for some extent, seems impregnated with inflammable vapours. A reed stuck in the ground continues to burn like a flambeau; a hole made beneath the surface of the earth, instantly becomes a furnace, answering all the purposes of a culinary fire. EDITOR.

There are two kinds of EARTHQUAKES, the one caused by the action of subterraneous fires, and the explosion of volcanoes, which are only felt at limited distances, and at the times when volcanoes act, or before they open; when the matters which form subterraneous fires ferment, heat, and inflame, the fire makes an effort on every side; and if it does not find a natural vent, it raises the earth and forms a passage by throwing it out, which produces a volcano, whose effects are repeated, and last in proportion to the quantity of inflammable matters. If the quantity of matters which take fire is not considerable, a commotion or an earthquake may ensue, without a volcano being formed. The air produced and rarefied by the subterraneous fire, may also find small vents, by which it will escape, and in this case there will be only a shock without any eruption or volcano: but when the inflamed matter is in a great quantity, and confined by solid and compressed matters, then a commotion and volcano arises; but all these commotions form only the first kind of earthquakes, and can only shake a small space of ground. A very violent eruption of Mount Etna will cause, for example, an earthquake throughout the whole island of Sicily; but it will never extend to the distance of three or four hundred leagnes. When any new mouths are formed in Mount Vesuvius, there are earthquakes at Naples and in the neighbourhood of the volcano: but these earthquakes have never shaken the Alps, and are not communicated to France or to other countries remote from the source of the phenomenon.

But there is another kind of earthquake, very different in its effects, and perhaps in its causes; there are earthquakes which are felt at great distances, and which shake a long course of ground, without any new volcano or eruption appearing.

To understand rightly what may be the causes of this kind of earthquake, it must be remembered, that all inflammable matters capable of explosion, produce, like gunpowder, by inflammation, a great quantity of air and vapour; that this air produced by fire is in a state of very great rarefaction. Let us therefore suppose, that at a very considerable depth, as at or about one or two hundred fathoms, pyrites, and other sulphurous matters are to be met with; and, that, by the fermentation produced by the filtration of the water, or other causes, they inflame; and let us see what must happen: at first, these matters are not disposed regularly by horizontal strata, as the more ancient matters are, which have been formed by the sediment of the waters; on the contrary, they are formed in perpendicular strata, in caverns at the foot of these clefts, and in other parts where the water can act and penetrate. These matters inflaming, will produce a great quantity of air or vapour, the spring of which compressed in a small space, like that of a cavern, will not shake the earth immediately above, but will search for passages in order to make its escape; it will therefore naturally force its way through those parts where it meets the least obstruction, and will therefore proceed through the interstices between the different strata, or through any channel or caverns which may afford it a passage. This subterraneous air or vapour will therefore produce in its passage a noise and motion, proportioned to its force and to the resistance it meets with; and these effects will continue till it finds a vent, perhaps in the sea, or till it has diminished its force by being greatly expanded. This explanation corresponds entirely with all the phenomena which are observed respecting earthquakes. They proceed with a wave-like motion, and are felt at different places, not at the same instant, but at different times, in proportion to the distance.

We can only confirm what has been advanced, by connecting it with two other circumstances. It is well known that mines exhale vapours, independent of the wind produced by the current of the water; we often see currents of unhealthy air and suffocating vapours; it is also known that there are holes, abysses, and deep lakes in the earth, which produce winds, like the lake Boleslaw, in Bohemia, &c.

From history we have innumerable instances of the dreadful and various effects of these terrible phenomena. Pliny, in his first book, chap. lxxxiv. relates, that in the reign of Tiberius, an earthquake happened, which overthrew twelve cities in Asia; and in his second book he says, that by a great earthquake there were one hundred towns overthrown in Libya. In the time of Trajan, the city of Antioch, and a great part of the adjacent country, were swallowed up by an earthquake; and, in the time of Justinian, in 528, this town was a second time destroyed by a similar cause, with upwards of forty thousand of its inhabitants: and, sixty years after, in the time of Saint Gregory, it felt the effects of a third earthquake, with the loss of sixty thousand persons. In the time of Saladin, in 1182, most of the towns of Syria and Jerusalem were destroyed by the same cause. In Calabria and Pola, there have been more earthquakes than in any other part of Europe. In the time of Pope Pius XI. all the churches and palaces of Naples were overthrown, and above thirty thousand of its inhabitants killed; and all those which remained alive were obliged to live in tents, till they had rebuilt their houses. In 1629, there were earthquakes in Pola, which destroyed seven thousand persons; and in 1638, the town of St. Euphemia was swallowed up; and there remains only a stinking lake in its place. Ragusa and Smyrna were also almost destroyed. There was an earthquake in 1692, which extended into England, Holland, Flanders, Germany, and France; it was chiefly felt on the sea coasts and rivers, and extended to a space of at least two thousand six hundred leagues square. On the 16th of June, 1628, there was so terrible an earthquake in the island of St. Michael, that the sea near it opened, and, in one place, where it was more than one hundred and fifty fathoms deep, threw up an island more than a league and a half long, and upwards of sixty fathoms high.

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Of the caverns produced by fire, Iceland yields numerous examples. Some of them are of great extent, and are made use of by the inhabitants for sheltering their being solid and full in these places, fire cannot be excited, like that of volcanoes, in which there are cavities and void places where the air penetrates, which must necessarily extend the conflagration and augment the action of the fire, to the point in which we see it when it produces the terrible effects we have spoken of.

There are two kinds of EARTHQUAKES, the one caused by the action of subterraneous fires, and the explosion of volcanoes, which are only felt at limited distances, and at the times when volcanoes act, or before they open; when the matters which form subterraneous fires ferment, heat, and inflame, the fire makes an effort on every side; and if it does not find a natural vent, it raises the earth and forms a passage by throwing it out, which produces a volcano, whose effects are repeated, and last in proportion to the quantity of inflammable matters. If the quantity of matters which take fire is not considerable, a commotion or an earthquake may ensue, without a volcano being formed. The air produced and rarefied by the subterraneous fire, may also find small vents, by which it will escape, and in this case there will be only a shock without any eruption or volcano: but when the inflamed matter is in a great quantity, and confined by solid and compressed matters, then a commotion and volcano arises; but all these commotions form only the first kind of earthquakes, and can only shake a small space of ground. A very violent eruption of Mount Etna will cause, for example, an earthquake throughout the whole island of Sicily; but it will never extend to the distance of three or four hundred leagnes. When any new mouths are formed in Mount Vesuvius, there are earthquakes at Naples and in the neighbourhood of the volcano: but these earthquakes have never shaken the Alps, and are not communicated to France or to other countries remote from the source of the phenomenon.

But there is another kind of earthquake, very different in its effects, and perhaps in its causes; there are earthquakes which are felt at great distances, and which shake a long course of ground, without any new volcano or eruption appearing.

To understand rightly what may be the causes of this kind of earthquake, it must be remembered, that all inflammable matters capable of explosion, produce, like gunpowder, by inflammation, a great quantity of air and vapour; that this air produced by fire is in a state of very great rarefaction. Let us therefore suppose, that at a very considerable depth, as at or about one or two hundred fathoms, pyrites, and other sulphurous matters are to be met with; and, that, by the fermentation produced by the filtration of the water, or other causes, they inflame; and let us see what must happen: at first, these matters are not disposed regularly by horizontal strata, as the more ancient matters are, which have been formed by the sediment of the waters; on the contrary, they are formed in perpendicular strata, in caverns at the foot of these clefts, and in other parts where the water can act and penetrate. These matters inflaming, will produce a great quantity of air or vapour, the spring of which compressed in a small space, like that of a cavern, will not shake the earth immediately above, but will search for passages in order to make its escape; it will therefore naturally force its way through those parts where it meets the least obstruction, and will therefore proceed through the interstices between the different strata, or through any channel or caverns which may afford it a passage. This subterraneous air or vapour will therefore produce in its passage a noise and motion, proportioned to its force and to the resistance it meets with; and these effects will continue till it finds a vent, perhaps in the sea, or till it has diminished its force by being greatly expanded. This explanation corresponds entirely with all the phenomena which are observed respecting earthquakes. They proceed with a wave-like motion, and are felt at different places, not at the same instant, but at different times, in proportion to the distance.

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Scarcely any part of the globe is without caverns. North and South America have them on a gigantic scale. The cavern of Caripe, in Colombia, is two thousand eight hundred feet in length. In Europe, there are caverns in Great Britain, France, Germany, the Austrian dominions, Greece, and other countries. Those of Adelsberg, in Carniola, are said to afford a subterranean walk of two leagues. Those of Derbyshire, two of which have already been noticed, are of considerable magnitude.

One of the most beautiful of these caves is that of Corycia, near Parnassus, in Greece. Mr. Raikes, by whom it was visited, thus describes it: "I had been so repeatedly disappointed with scenes of this kind—they had so generally appeared inferior to the descriptions given of them, that I expected to meet with the same reverse here, and to find nothing but a dark, narrow vault. I was, however, to be for once agreeably surprised. The narrow and low entrance of the cave spread at once into a chamber three hundred and thirty feet long, by nearly two hundred wide. The stalactites from the top hung in the most graceful forms, the whole length of the roof, and fell, like drapery, down the sides. The depth of the folds was so vast, and the masses thus suspended in the air were so great, that the relief and fulness of these natural hangings, were as complete as the fancy could have wished. They were not, like concretions or incrustations, mere coverings of the rock; they were the gradual growth of ages, disposed in the most simple and majestic forms, and so rich and large, as to accord with the size and loftiness of the cavern.

The stalagmites below and on the sides of the chamber, were still more fantastic in their forms, than the pendents above, and struck the eye with a fancied resemblance of vast human figures.

"At the end of this great vault, a narrow passage leads down a wet slope of rock. With some difficulty, from the slippery nature of the ground on which I trod, I went a considerable way on, until I came to a place where the descent grew very steep; and my light being nearly exhausted, it seemed best to return. On my way back, I found, half buried in the clay, on one side of the passage, a small antique *patera*, of the common black and red ware. The incrustation of the grotto had begun to appear; but it was unbroken, and I was interested in finding this simple relic of the homage once paid to the Corycian nymphs by the ancient inhabitants of the country. The stalagmitic formations on the entrance of this second passage are wild as imagination can conceive, and of the most brilliant whiteness.

"It would not require a fancy as lively as that of the ancient Greeks, to assign this beautiful grotto as a residence to the nymphs. The stillness which reigns through it, broken only by the gentle sound of the water which drops from the points of the stalactites (the υδατ αεναοντα of the grotto of the Nymphs in the Odyssey), the dim light admitted by its narrow entrance, and reflected by the white ribs of the roof, with all the miraculous decorations of the interior, would impress the most insensible with feelings of awe, and lead him to attribute the influence of the scene to the presence of some supernatural being. An inscription, which still remains on a mass of rock near the entrance, marks that the cavern has been dedicated to Pan and the Nymphs."

One of the most celebrated caverns, though not superior to many others, is that of Antiparos, an ample description of which has been given us by M. de Tournefort. It is computed to be three hundred fathoms deep from the surface of the earth; but the grotto appears to be forty fathoms high by fifty broad; it is filled with large beautiful stalactites, or sparry pillars like icicles, of various forms, as well on the roof of the vault as at the bottom.

In mountainous countries, great ravages are often occasioned by the falling or sliding down of immense portions of the impending rocks. In 1618, the town of Pleurs, and the village of Schilano, about a league from Chiavenna, were buried in an instant beneath the ruins of a part of Mount Conto. Three persons, who chanced to be absent from their homes, were the only individuals who escaped. All the rest of the inhabitants, two thousand four hundred and thirty in number, perished. Of the works of man not a vestige remained visible, except a country house, and a cellar which was formed in the rock.

In the month of June, 1714, a part of the mountain of Diablerets in the Valais, fell suddenly, between two and three o'clock in the afternoon, when the sky was very serene. The mountain, was of a conical figure, and destroyed fifty-three huts belonging to the boors, and crushed to death fifteen people, and more than a hundred head of large, and much more of small cattle, covering a square league with the ruins it occasioned. A profound darkness was caused by the dust: the heaps of stones thrown together were above thirty perches: these heaps stopped the current of the water, which formed new and very deep lakes. On this occasion, one individual had a remarkable escape. His cottage was covered, but not crushed, by the fallen fragments, and he contrived to support life by means of his stock of cheese, and the water of a spring. Three months elapsed before he was extricated from his horrible situation.

Another fall took place from this mountain, in 1749, which did infinite mischief, and formed the small lake of Derborenze.

A still more dreadful catastrophe occurred in the canton of Schwitz, on the 2d of September, 1806. After long continued rain, the Gnipenpitz, one of the summits of the Ruffiberg, gave way with a terrific noise, and rushed down to the valley, where it spread devastation on all sides. The mass was one thousand feet long, and one hundred high. It buried the villages of Goldau, Busingen, and Rothen, with some houses of Lowertz, filled a part of the lake of Lowertz, and drove its waters forward with such violence that they swept every thing before them to a considerable distance. The valley was covered, to a depth of several feet, with earth and enormous blocks of stone, and new hills and new lakes were formed. Such was the impetuosity with which the mass descended, that large fragments of rock were carried far up an opposite mountain. Nearly five hundred persons were the victims of this lamentable event.

The most recent occurrence of this kind is the fall of a part of the glacier of the Weisshorn, in the upper Valais, which took place at six in the morning of the 27th of December, 1819. The avalanche, formed of snow, ice, and stones, but chiefly of the two former, was one hundred and fifty feet high, contained three hundred and sixty millions of cubic feet, and covered the fields and meadows for a width of one thousand feet, and a length of two thousand four hundred. From the most high and rugged peak of the Weisshorn, which rises to an altitude of nine thousand feet, it rushed with the sound of thunder on the mass of ice below. At the instant when the snow and ice struck the inferior mass of the glacier, the pastor of the village, the sacristan, and some other persons, observed a light, which almost instantly disappeared, and left everything enveloped in the darkest night. A frightful hurricane, occasioned by the pressure of the air, immediately succeeded, and in an instant produced the most tremendous devastation. The precipitated masses of ice did not reach the valley, but the hurricane occasioned by their fall was so violent, that it carried substances several fathoms up the mountain; tore up by the roots the largest larch trees at great distances; projected blocks of ice of some cubic feet beyond the village to the distance of half a league; bore away the spire of the steeple; levelled several houses with the ground; and carried the carpentry of many edifices more than a quarter of a league beyond the village, into the forest which lies above it. Happily, only two lives were lost.

When the waters on the surface of the earth cannot find vent to flow, they form MORASSES and BOGS. The most famous morasses in Europe are, those of Muscovy at the source of the Tanais; those of Finland, where the great morasses of Savolax and Enasak are; there are also some in Holland, Westphalia, and many other low countries; in Asia, the morasses of the Euphrates, those of Tartary, and the Palus Meotidis: nevertheless, in general, there are fewer of them in Asia and Africa than in Europe; but America may be said to be but one continued morass, throughout all its plains. This great number of morasses is a proof of the modern date of the country, and of the small number of inhabitants, and still more of their want of industry.

A circumstance related by Dr. Plot will serve to give an idea of the quantity of earth which the rain detaches from the mountains, and carries along with it into the valleys: in his Natural History of Staffordshire, he says, that, eighteen feet deep in the earth, a great number of pieces of money coined in the reign of Edward V. have been found; i. e. two hundred years before his time; so that this ground, which is boggy, has increased above a foot in eleven years, or an inch and a twelfth every year. We may still make a similar observation on trees buried at seventeen feet depth, below which medals of Julius Cæsar have been found; so that the earth brought from the tops of mountains into plains by running waters, serves very considerably to increase the elevation of the ground of plains.

It is evident, that considerable changes have taken place on the surface of the globe not only by the action of fire, but by water also. The sea, from various circumstances, has repeatedly changed its bed. Authors have suspected, that the island of Great Britain was formerly united to the continent of France. On the coast of France, England, Holland, and Germany, the sea has retreated in many parts. In Italy, a considerable tract of territory has been gained by the retreating of the ocean; and Ravenna, which was formerly a seaport of the Exarchate, is no longer a maritime town.

In the city of Modena, and four miles round, whatever part is dug, when we reach the depth of sixty-three feet, and bore five feet deeper with an auger, the water springs out with such force, that the well is filled in a very short space of time. This water flows continually, and neither diminishes nor increases by the rain or drought. What is remarkable in this ground is, that when we reach the depth of fourteen feet, we find pavements, and other ruins of an ancient town, as boards, houses, different pieces of mosaic work, &c. after which we find a very solid ground, which is thought to have never been stirred; yet below it there is a moist earth mixed with vegetables; and at twenty-six feet are entire trees, as nut trees, with nuts on them, and a great quantity of branches and leaves of trees;* at twenty-eight feet depth, we meet with a friable chalk, mixed with many shells; and this bed is eleven feet in thickness; after which, we again meet with vegetables, and so on alternately chalk and earth mixed with vegetables, to the depth of sixty-three feet; at which depth is a bed of sand mixed with some gravel and shells, like those formed on the coasts of the Italian sea. These successive beds of fenny or marshy earth and chalk are always met with in the same order, wherever we dig; and very often the auger meets with large trunks of trees, which it bores through, and which occasions great trouble to the workmen: bones, coals, flint, and pieces of iron are also found. Ramazzini, who relates these circumstances, thinks that the gulf of Venice formerly extended as far as and even beyond Modena; and that, by course of time, and perhaps by the inundations of the sea, this ground has been formed.

CHAP. V.

Of the Nature of Man....Of Infancy....Manhood....Extent of Human Life....Of the Senses....Anecdotes illustrative of this Subject.

Man is a being compounded of two distinct natures, body and soul. The soul exists independently of the senses, but receives all its information by their means. The leper whose skin is dried up, has no sense of external feeling; and a man deaf from infancy, has no idea of sounds. But to give a more perfect idea of the nature of man, it will be proper to pursue him through the different stages of his existence.

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* A submarine forest exists on the coast of Lincolnshire and Yorkshire. Ed.

At his birth, the INFANT is exposed to a new element, the air. What the sensations are on the admission of this element into the lungs, it is impossible to guess; but, from the cries of the infant, we may conjecture that it is attended with pain. The eyes of an infant are indeed open, but they are dull, and appear to be unfitted for the performance of any office whatever; and the outward coat of them is wrinkled. The same reasoning will apply to most of the other senses. It is not till after forty days that it begins to smile; nor is it till then that it begins to weep: its former sensations of pain are unaccompanied with tears. The size of an infant born at the full time, is twenty-one inches, though some do not exceed fourteen; and it generally weighs twelve, and sometimes fourteen pounds. The form of the body and members of a new-born infant are by no means perfect. At the end of three days, there usually appears a kind of jaundice: and, at that time, there is generally milk in the breast of the infant, which is squeezed out with the fingers. The skull of infants is not completely formed: in the language of the nursery, the head is OPEN in a particular part; that is, the skull bones have not yet grown far enough to meet. In this opening, a palpitation may sometimes be discovered; and the beating of the arteries may always be felt. Above this opening, a species of scurf appears, which is rubbed off with a brush. Formerly, infants, as soon as born, were injudiciously and unnaturally laced with bandages; so that they were not able to move a single joint. Nations which we call barbarous act more rationally and more humanely in this respect. The Siamese, the Indians, the Japanese, the Negroes, the Savages of America, lay their infants naked in hanging beds of cotton, or in cradles lined with fur.

Infants sleep much, but their sleep is often interrupted. They ought to have the breast every two hours in the day, and in the night as often as they awake. It is of great importance to keep children clean and dry from their excrements. The American Indians, who cannot change their furs as frequently as we can our cloths, put under them the dust of rotten wood, and renew it as often as it becomes damp. Great evils ensue from the negligence of nurses. Infants are frequently left to cry for a considerable time, which often occasions diseases, or, at least, throws them into a state of lassitude, which deranges their constitutions. To palliate this, they are sometimes put into a cradle and rocked to sleep, which may occasionally derange the stomach and head. Before children are put into the cradle, we ought to be certain that they want nothing, and when they are rocked, it ought never to be with such violence as to stun or stupefy them. The eyes of children are always directed towards the light, and if only one eye be directed to it, the other will probably become weak ; both eyes ought, therefore, to be equally shaded, or equally exposed. Squinting is commonly the effect of injudicious treatment in this respect. For the first two or three months the diet of the infant ought to be chiefly confined to its mother's milk.

The eight incisores, or fore-teeth, appear first. They are produced generally by pairs, and from two months old to ten or twelve. The four canini (or dog-teeth), appear commonly about the ninth or tenth month. About the close of the first, or in the course of the second year, sixteen other teeth appear, called *molares*, or grinders. In the fifth, sixth, or seventh year the fore-teeth, the dog-teeth, and the first six of the grinders, naturally shed, and a new set appears. At the age of puberty, or later, the *dentes sapientiæ*, or wise teeth, appear. Women are said to have fewer teeth than men.

The hair of most infants is exceedingly light, almost white. When a child is suffered to cry violently, and too long, it is in danger of a rupture; but the early application of bandages or trusses will frequently remove the complaint.

The frame of infants is said (perhaps erroneously) to be less sensible of cold than during any other season of life. The pulse is certainly strong, and it is therefore fair to conclude that the internal heat is considerable. Till the age of three years the life of infants is extremely precarious:* in the course of the ensuing second and third years it becomes more certain, and at six or seven a child has a greater probability of living than at any other period of life. It is remarked that of a certain number of children born at the same time, above a fourth die in the first year, above a third in two years, and at least one half in three years. By other calculations, it appears that one half of the children born at the same time, are not extinct in less than seven or eight years.†

At twelve or fifteen months infants begin to lisp. A is the vowel which they pronounce with most ease. Of the consonants B, M, P, T, are most easy. In every language, therefore, *Baba*, *Mama*, *Papa*, are the first words that children learn. Some children pronounce distinctly in two years, though the generality do not speak for two years and a half, and frequently not so early.

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* It is rendered still more so by injudicious treatment. Vegetable diet and frequent purges murder innumerable poor infants. As the animal frame is in a state of debility at this period of life, strengthening animal food is certainly most proper; and, as the intestines are generally inclined to à state of relaxation, frequent purges are certain to be destructive. EDITOR.

† Since the period when Buffon wrote, the probability of life, in infancy, has much increased, in consequence of the introduction of vaccination, and the more rational manner in which children are managed. ED.

Some young persons cease growing at fourteen or fifteen, while others continue their growth to twenty-two or twenty-three. In men the body attains its perfect proportion at the age of thirty, and in women sooner. The persons indeed of women are generally complete at twenty. The distance between the eyes is less in man than in any other animal; in some creatures, in fact, the eyes are at so great a distance, that it is impossible they should ever view the same object with both eyes at once. Men and apes are the only animals that have eyelashes on the lower eyelid. Other animals have them on the upper, but want them on the lower lid. The upper lid rises and falls, the lower has scarcely any motion.

The ancients erroneously considered the hair as a kind of excrement, and believed that, like the nails, it increased by the lower part putting out the extremity; but the moderns have discovered that every hair is a tube, which fills and receives nutriment like the other parts of the body. The roots, they observe, do not turn gray sooner than the extremities, but the whole changes colour at once. Instances have been known of persons who have grown gray in one night.

There is no part of the body which has been subject to such changes of fashion as the hair and the beard. Some people, and among others the Turks, cut the hair off their heads, and let their beards grow. The Europeans, on the contrary, shave their beards, and wear their hair. The negroes shave their heads in figures at one time, in stars at another, in the manner of friars; and still more commonly in alternate stripes; and their little boys are shaved in the same manner. The Talapoins, of Siam, shave the heads and the eyebrows of such children as are committed to their care. Every nation seems to have entertained different prejudices, at different times, in favour of one part or another of the beard.

The neck supports the head, and unites it to the body. This part is much more considerable in the generality of quadrupeds than in man. But fishes, and other animals that have not lungs similar to ours, have no neck whatever. Birds, in general, have the neck longer than any other kind of animal: those of them which have short claws, have also short necks; those, on the contrary, that have them long, are found to have the neck in proportion.

The human breast is outwardly formed in a very different manner from that of other animals. It is larger in proportion to the size of the body; and none but man, and such animals as make use of their fore feet as hands, such as monkeys, bats, and squirrels, are found to have those bones called clavicles, or, as we usually term them, collar bones. The breasts in women are larger than in men; however, they seem formed in the same manner; and, sometimes, milk is found in the breasts of men, as well as in those of women. Birds, and all other oviparous* animals, have no teats; but viviparous † fishes, as the whale and the dolphin, have both teats and milk.

There is little known exactly with regard to the proportion of the human figure; and the beauty of the best statues is better conceived by observation than by measurement. Some, who have studied after the ancient masters, divide the body into ten times the length of the face, and

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Those which breed from eggs.

† Those which produce their young alive, and without eggs.

others into eight. They tell us, that there is a similitude of proportion in different parts of the body: thus, that the hand is the length of the face; that the thumb is the length of the nose; that the space between the eyes is the breadth of the eye; that the breadth of the thickest part of the thigh is double that of the thickest part of the leg, and treble the smallest; that the arms extended are as long as the figure is high; that the legs and thighs are the length of the figure.

The strength of man is very considerable when matured by practice. We are assured, that the porters of Constantinople carry burthens of not less weight than nine hundred pounds; and Mr. Desaguliers tells us of a man in an upright posture, who by distributing a certain number of weights, in such a manner that every part of his body bore its share, was able to support a weight of two thousand pounds.

The strength of a man may be still farther estimated by the continuance of his labour, and by the agility of his motions. Men, who are exercised in running, outstrip horses, or at least continue their speed for a greater length of time. In a journey, also, a man will walk down a horse; and after they have proceeded together for several days, the horse will be quite tired, and the man will be as fresh as at the beginning. The royal messengers of Ispahan, who are runners by profession, go thirty-six leagues in fourteen or fifteen hours. Travellers assure us, that the Hottentots outrun lions in the chase; and that the savages who hunt the elk pursue with such speed this animal, which is as fleet as a stag, that they at last tire it down, and take it. The civilized man is ignorant of his own strength, nor is he sensible how much he loses of it by effeminacy, and how he might add to it by the habit of vigorous exercise.

Lest our description of man should be found imperfect, it will be proper to examine the human countenance, as it appears among ourselves, when agitated by the PASSIONS. In affliction, in excessive joy, in love, in shame, in compassion, the eyes are apt to be swelled, and in a manner obscured, by an overflow of tears. The effusion of these is always accompanied with a tension of the muscles of the visage, by which there is occasioned an opening of the mouth. At the same time, the natural moisture in the nose becomes more copious, and, by internal passages, blends itself with the lachrymal moisture, which does not, however, flow uniformly, but at intervals.

In sorrow, the two corners of the mouth are lowered, the middle of the under lip is raised, the eyelid is half closed, the pupil of the eye is raised, and almost covered with the eyelid, and the other muscles of the face are so much relaxed, that the space between the mouth and the eyes is larger than ordinary, and of consequence the countenance appears lengthened.

In fear, terror, or horror, the forehead is wrinkled, the eyebrow is raised, the eyelids are as much as possible extended, and discover a part of the white of the eye over the pupil; which is lowered, and somewhat concealed by the inferior eyelid; the mouth, at the same time, is widely opened, and the lips being separated, both the upper and under teeth are seen.

In contempt and derision, the upper lip is raised on one side, and on the other there is a little motion, as if in order to smile; the nose is shrivelled on the same side that the lip is raised, and the corner of the mouth is extended; the eye on the same side is almost shut, while the other is open as usual, but the pupil of each is lowered, as when one looks from high to low.

In jealousy, envy, and malice, the eyebrow falls down, and is knit, the eyelid is raised, and the pupil lowered; the under lip is raised on each side, while the corners of the mouth are rather lowered, and the middle of the under lip is raised, in order to join the middle of the upper one.

In laughter, the two corners of the mouth are extended, and somewhat raised; the upper part of the cheeks is raised, and the eyes are more or less closed; the upper lip is raised, while the under one is lowered; and, in immoderate laughter, the mouth is opened, and the skin of the nose is contracted.

When the constitution of the body is sound, it is possible, perhaps, by moderation in the passions, temperance, and sobriety, to lengthen out the period of LIFE for a few years. But even of this there seems an uncertainty. Men no doubt there are who have passed the usual period of human existence; and, not to mention Parr, who lived to the age of one hundred and fifty-two, and Jenkins to that of one hundred and sixty-nine, as recorded in the Philosophical Transactions, we have many instances of the prolongation of life to one hundred and ten, and even to one hundred and twenty years. Yet this longevity was occasioned by no peculiar art or management. On the contrary, it appears, that the generality of such long livers were peasants accustomed to the greatest fatigues, huntsmen, or labourers; men, in fact, who had employed their whole bodily strength, and even abused it, if to abuse it is possible, otherwise than by continual idleness and debauchery.

If in the duration of life there is any difference to be found, it ought seemingly to be ascribed to the quality of the air. In elevated situations, it has been observed, there are commonly found more old people than in such as are low. The mountains of Scotland and Wales, of Auvergne and Switzerland, have furnished more instances of extreme longevity than the plains of Holland or Flanders, of Germany or Poland. In general, however, the period of human existence may be said to be the same in every country. If not cut off by accidental diseases, man is found to live to the years of ninety or a hundred. Beyond that date our ancestors did not live; nor has it in any degree varied since the time of David.

From a careful inspection of the registers of burials in a certain number of country parishes in France, compared with the mortality of Paris, the following table has been made out of the probable duration of human life.

TABLE OF THE PROBABILITIES OF THE DURATION OF LIFE.

Age.	Duration of Life.		Age.	Duration of Life.		Age.	Duration of Life.	
Years	Years.	Months.	Years.	Years.	Months.	Years.	Years.	Months.
0	8	0	29	28	6	58	12	3
1	33	0	30	28	0	59	11	8
2	38	0	31	27	6	60	11	1
3	40	0	32	26	11	61	10	6
4	41	0	33	26	3	62	10	0
5	41	6	34	25	7	63	9	6
6	42	0	35	25	0	64	9	0
7	42	3	36	24	5	65	8	6
8	41	6	37	23	10	66	8	0
9	40	10	38	23	3	67	7	6
10	40	2	39	22	8	68	7	0
11	39	6	40	22	1	69	6	7
12	38	9	41	21	6	70	6	2
13	38	1	42	20	11	71	5	8
14	37	5	43	20	4	72	5	4
15	36	9	44	19	9	73	5	0
16	36	0	45	19	3	74	4	9
17	35	4	46	18	9	75	4	6
18	34	8	47	18	2	76	4	3
19	34	0	48	17	8	77	4	1
20	33	5	49	17	2	78	3	11
21	32	11	50	16	7	79	3	9
22	32	4	51	16	0	80	3	7
23	31	10	52	15	6	81	3	5
24	31	3	53	15	0	82	3	3
25	30	9	54	14	6	83	3	2
26	30	2	55	14	0	84	3	1
27	29	7	56	13	5	85	3	0
28	29	0	57	12	10			

By this Table it appears, that it is reasonably to be expected, or, in other words, that we may lay an even wager, that an infant newly born will live eight years; that an infant of one year will live thirty-three years longer; that an infant of two years will live thirty-eight years longer; that a man of twenty will live thirty-three years and five months longer; that a man of thirty will live twenty-eight years longer; and so proportionally of every other age.*

IDEAS of external things are conveyed to the soul of man by means of the five SENSES, *seeing*, *hearing*, *feeling*, *tasting*, and *smelling*. The organs by which the senses act are the nerves, which are small thread-like fibres distributed all over the body, and all of them connected with the brain.

The eyes seem to be formed very early in the human embryo. In the chicken also, of all the parts that are double, these are the soonest produced; and it is observed, from the eggs of several sorts of birds, as well as from those of lizards, that the eyes are much larger and more early in their expansion than any other parts of the twofold growth. Though in viviparous animals, and particularly in man, they are, at first, by no means so large in proportion as in the oviparous classes, yet they obtain their due formation sooner than any other parts of the body. Thus it is also with the organ of hearing. The little bones that help to compose the internal parts of the ear, are entirely formed before any of the other bones, however large they may afterwards become, have acquired any part of their growth and solidity. Hence it is evident, that the parts of the body which are furnished with the greatest quantity of nerves are those which appear the soonest, and which are the soonest brought to perfection.

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* This table must be considered only as an approximation to the truth; the data upon which it is founded being imperfect. ED.

Mr. Cheselden, having couched for a cataract a boy of thirteen years of age, who had been blind from his birth, and having thus communicated to him the sense of seeing, was at great pains to mark the progress of his visual powers. This youth, though hitherto incapable of seeing, was not, however, absolutely and entirely blind. Like every other person, whose vision is obstructed by a cataract, he could distinguish day from night, and even black from white, or either of them from the vivid colour of scarlet. Of the form of bodies, however, he saw nothing, nor of colours themselves, unless the light was strong. At first, the operation was performed only upon one of his eyes; and when he saw for the first time, so far was he from forming the smallest conception of distances, that he supposed (as he himself expressed it) every thing he saw touched his eyes, in the same manner as every thing he felt touched his skin. The objects that pleased him most were those of which the surfaces were plane, and the figures regular; though as yet he could in no degree judge of their different forms, or assign a reason why some were more agreeable to him than others. The ideas he had entertained of colours, during his former dark state, were so imperfect that when he saw them in reality, he could hardly be persuaded they were the same. When such objects were shown him as he had been formerly familiar with, by the touch, he observed them with earnestness, in order to distinguish them a second time. As of these, however, he had too many to retain all at once, the greatest number were forgotten; and for one thing which he knew, after seeing it, there were a thousand things, according to his own declaration, of which he no longer possessed the smallest remembrance. He was very much surprised to find that those persons, and those things which he had loved best, were not the most pleasing to the eye; nor could he help testifying his disappointment in finding his parents less handsome than he had conceived them to be. Before he could distinguish that a picture resembled a solid body, about two months elapsed. Till then, he only considered it as a surface diversified by a variety of colours: but, when he began to perceive that these shadings actually represented human beings, he also began to examine, by the touch, whether they had not the usual qualities of such bodies; and great was his surprise to find smooth and even, what he had supposed a very unequal surface. He was then shown a miniature portrait of his father, which was contained in his mother's watch-case; and though he readily perceived the resemblance, yet he expressed his amazement, how so large a face could be comprised in so small a compass. To him it appeared as strange as that a pint vessel should contain a bushel. At first, he could bear but a very small quantity of light, and he saw every object much greater than life; but in proportion as he observed objects that were in reality large, so in proportion he conceived the others to be diminished. Beyond the limits of what he saw, he had no conception of any thing. He knew that the apartment he occupied was only a part of the house; and yet he could not imagine how the latter should appear larger than the former. Before the operation, he formed no great expectations of the pleasures he should receive from the new sense he was promised. That he might be enabled to read and write was his grand object. He said, among other things, that he could enjoy no greater delight from walking in the garden, with this sense, than without it; because there he already walked at his ease, and was acquainted with all the walks. With great truth he also remarked, that his blindness gave him one advantage over the rest of mankind; an advantage which indeed he preserved for a long time after he had obtained the sense of seeing; namely, that of being able to walk in the night with confidence and security. No sooner, however, had he begun to enjoy this new sense, than he was transported beyond measure; and he declared, that every new object was a new source of delight to him; that his pleasure was so great he had not language to express it. About a year after, he was carried to Epsom, where there is a very beautiful and a very extensive prospect; with this he seemed greatly charmed; and the landscape before him he called a new method of seeing. He was couched in the other eye, a year after the former, and of both operations the success was equally great. When he saw with both eyes, every object appeared to him twice as large as when he saw but with one eye, though he did not see double, or at least he showed no marks from which any such conclusion might be drawn.

A still more interesting case of this kind has recently occurred, and is recorded in the Philosophical Transactions. The subject of it was a lady who was born blind, and who recovered her sight after she had entered on her forty-seventh year. When about six months old, she was placed under a Parisian oculist, who performed an operation on both eyes, with a view to afford her sight. The operation proved unsuccessful; the right eye was attacked with inflammation and completely destroyed, and in the left the vision was not restored. The lady continued in this situation till after she had reached her forty-sixth year, when she applied to Mr. Wardrop. This gentleman found the right eyeball collapsed, but the left possessing its natural consonants B, M, P, T, are most easy. In every language, therefore, *Baba*, *Mama*, *Papa*, are the first words that children learn. Some children pronounce distinctly in two years, though the generality do not speak for two years and a half, and frequently not so early.

Some young persons cease growing at fourteen or fifteen, while others continue their growth to twenty-two or twenty-three. In men the body attains its perfect proportion at the age of thirty, and in women sooner. The persons indeed of women are generally complete at twenty. The distance between the eyes is less in man than in any other animal; in some creatures, in fact, the eyes are at so great a distance, that it is impossible they should ever view the same object with both eyes at once. Men and apes are the only animals that have eyelashes on the lower eyelid. Other animals have them on the upper, but want them on the lower lid. The upper lid rises and falls, the lower has scarcely any motion.

The ancients erroneously considered the hair as a kind of excrement, and believed that, like the nails, it increased by the lower part putting out the extremity; but the moderns have discovered that every hair is a tube, which fills and receives nutriment like the other parts of the body. The roots, they observe, do not turn gray sooner than the extremities, but the whole changes colour at once. Instances have been known of persons who have grown gray in one night.

There is no part of the body which has been subject to such changes of fashion as the hair and the beard. Some people, and among others the Turks, cut the hair off their heads, and let their beards grow. The Europeans, on the contrary, shave their beards, and wear their hair. The negroes shave their heads in figures at one time, in stars at another, in the manner of friars; and still more commonly in alternate stripes; and their little boys are shaved in the same manner. The Talapoins, of Siam, shave the heads and the eyebrows of such children as are committed to their care. Every nation seems to have entertained different prejudices, at different times, in favour of one part or another of the beard.

The neck supports the head, and unites it to the body. This part is much more considerable in the generality of quadrupeds than in man. But fishes, and other animals that have not lungs similar to ours, have no neck whatever. Birds, in general, have the neck longer than any other kind of animal: those of them which have short claws, have also short necks; those, on the contrary, that have them long, are found to have the neck in proportion.

The human breast is outwardly formed in a very different manner from that of other animals. It is larger in proportion to the size of the body; and none but man, and such animals as make use of their fore feet as hands, such as monkeys, bats, and squirrels, are found to have those bones called clavicles, or, as we usually term them, collar bones. The breasts in women are larger than in men; however, they seem formed in the same manner; and, sometimes, milk is found in the breasts of men, as well as in those of women. Birds, and all other oviparous* animals, have no teats; but viviparous † fishes, as the whale and the dolphin, have both teats and milk.

There is little known exactly with regard to the proportion of the human figure; and the beauty of the best statues is better conceived by observation than by measurement. Some, who have studied after the ancient masters, divide the body into ten times the length of the face, and

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Those which breed from eggs.

† Those which produce their young alive, and without eggs.

others into eight. They tell us, that there is a similitude of proportion in different parts of the body: thus, that the hand is the length of the face; that the thumb is the length of the nose; that the space between the eyes is the breadth of the eye; that the breadth of the thickest part of the thigh is double that of the thickest part of the leg, and treble the smallest; that the arms extended are as long as the figure is high; that the legs and thighs are the length of the figure.

The strength of man is very considerable when matured by practice. We are assured, that the porters of Constantinople carry burthens of not less weight than nine hundred pounds; and Mr. Desaguliers tells us of a man in an upright posture, who by distributing a certain number of weights, in such a manner that every part of his body bore its share, was able to support a weight of two thousand pounds.

The strength of a man may be still farther estimated by the continuance of his labour, and by the agility of his motions. Men, who are exercised in running, outstrip horses, or at least continue their speed for a greater length of time. In a journey, also, a man will walk down a horse; and after they have proceeded together for several days, the horse will be quite tired, and the man will be as fresh as at the beginning. The royal messengers of Ispahan, who are runners by profession, go thirty-six leagues in fourteen or fifteen hours. Travellers assure us, that the Hottentots outrun lions in the chase; and that the savages who hunt the elk pursue with such speed this animal, which is as fleet as a stag, that they at last tire it down, and take it. The civilized man is ignorant of his own strength, nor is he sensible how much he loses of it by effeminacy, and how he might add to it by the habit of vigorous exercise.

Lest our description of man should be found imperfect, it will be proper to examine the human countenance, as it appears among ourselves, when agitated by the PASSIONS. In affliction, in excessive joy, in love, in shame, in compassion, the eyes are apt to be swelled, and in a manner obscured, by an overflow of tears. The effusion of these is always accompanied with a tension of the muscles of the visage, by which there is occasioned an opening of the mouth. At the same time, the natural moisture in the nose becomes more copious, and, by internal passages, blends itself with the lachrymal moisture, which does not, however, flow uniformly, but at intervals.

In sorrow, the two corners of the mouth are lowered, the middle of the under lip is raised, the eyelid is half closed, the pupil of the eye is raised, and almost covered with the eyelid, and the other muscles of the face are so much relaxed, that the space between the mouth and the eyes is larger than ordinary, and of consequence the countenance appears lengthened.

In fear, terror, or horror, the forehead is wrinkled, the eyebrow is raised, the eyelids are as much as possible extended, and discover a part of the white of the eye over the pupil; which is lowered, and somewhat concealed by the inferior eyelid; the mouth, at the same time, is widely opened, and the lips being separated, both the upper and under teeth are seen.

In contempt and derision, the upper lip is raised on one side, and on the other there is a little motion, as if in order to smile; the nose is shrivelled on the same side that the lip is raised, and the corner of the mouth is extended; the eye on the same side is almost shut, while the other is open as usual, but the pupil of each is lowered, as when one looks from high to low.

In jealousy, envy, and malice, the eyebrow falls down, and is knit, the eyelid is raised, and the pupil lowered; the under lip is raised on each side, while the corners of the mouth are rather lowered, and the middle of the under lip is raised, in order to join the middle of the upper one.

In laughter, the two corners of the mouth are extended, and somewhat raised; the upper part of the cheeks is raised, and the eyes are more or less closed; the upper lip is raised, while the under one is lowered; and, in immoderate laughter, the mouth is opened, and the skin of the nose is contracted.

When the constitution of the body is sound, it is possible, perhaps, by moderation in the passions, temperance, and sobriety, to lengthen out the period of LIFE for a few years. But even of this there seems an uncertainty. Men no doubt there are who have passed the usual period of human existence; and, not to mention Parr, who lived to the age of one hundred and fifty-two, and Jenkins to that of one hundred and sixty-nine, as recorded in the Philosophical Transactions, we have many instances of the prolongation of life to one hundred and ten, and even to one hundred and twenty years. Yet this longevity was occasioned by no peculiar art or management. On the contrary, it appears, that the generality of such long livers were peasants accustomed to the greatest fatigues, huntsmen, or labourers; men, in fact, who had employed their whole bodily strength, and even abused it, if to abuse it is possible, otherwise than by continual idleness and debauchery.

If in the duration of life there is any difference to be found, it ought seemingly to be ascribed to the quality of the air. In elevated situations, it has been observed, there are commonly found more old people than in such as are low. The mountains of Scotland and Wales, of Auvergne and Switzerland, have furnished more instances of extreme longevity than the plains of Holland or Flanders, of Germany or Poland. In general, however, the period of human existence may be said to be the same in every country. If not cut off by accidental diseases, man is found to live to the years of ninety or a hundred. Beyond that date our ancestors did not live; nor has it in any degree varied since the time of David.

From a careful inspection of the registers of burials in a certain number of country parishes in France, compared with the mortality of Paris, the following table has been made out of the probable duration of human life.

TABLE OF THE PROBABILITIES OF THE DURATION OF LIFE.

Age.	Duration of Life.		Age.	Duration of Life.		Age.	Duration of Life.	
Years	Years.	Months.	Years.	Years.	Months.	Years.	Years.	Months.
0	8	0	29	28	6	58	12	3
1	33	0	30	28	0	59	11	8
2	38	0	31	27	6	60	11	1
3	40	0	32	26	11	61	10	6
4	41	0	33	26	3	62	10	0
5	41	6	34	25	7	63	9	6
6	42	0	35	25	0	64	9	0
7	42	3	36	24	5	65	8	6
8	41	6	37	23	10	66	8	0
9	40	10	38	23	3	67	7	6
10	40	2	39	22	8	68	7	0
11	39	6	40	22	1	69	6	7
12	38	9	41	21	6	70	6	2
13	38	1	42	20	11	71	5	8
14	37	5	43	20	4	72	5	4
15	36	9	44	19	9	73	5	0
16	36	0	45	19	3	74	4	9
17	35	4	46	18	9	75	4	6
18	34	8	47	18	2	76	4	3
19	34	0	48	17	8	77	4	1
20	33	5	49	17	2	78	3	11
21	32	11	50	16	7	79	3	9
22	32	4	51	16	0	80	3	7
23	31	10	52	15	6	81	3	5
24	31	3	53	15	0	82	3	3
25	30	9	54	14	6	83	3	2
26	30	2	55	14	0	84	3	1
27	29	7	56	13	5	85	3	0
28	29	0	57	12	10			

By this Table it appears, that it is reasonably to be expected, or, in other words, that we may lay an even wager, that an infant newly born will live eight years; that an infant of one year will live thirty-three years longer; that an infant of two years will live thirty-eight years longer; that a man of twenty will live thirty-three years and five months longer; that a man of thirty will live twenty-eight years longer; and so proportionally of every other age.*

IDEAS of external things are conveyed to the soul of man by means of the five SENSES, *seeing*, *hearing*, *feeling*, *tasting*, and *smelling*. The organs by which the senses act are the nerves, which are small thread-like fibres distributed all over the body, and all of them connected with the brain.

The eyes seem to be formed very early in the human embryo. In the chicken also, of all the parts that are double, these are the soonest produced; and it is observed, from the eggs of several sorts of birds, as well as from those of lizards, that the eyes are much larger and more early in their expansion than any other parts of the twofold growth. Though in viviparous animals, and particularly in man, they are, at first, by no means so large in proportion as in the oviparous classes, yet they obtain their due formation sooner than any other parts of the body. Thus it is also with the organ of hearing. The little bones that help to compose the internal parts of the ear, are entirely formed before any of the other bones, however large they may afterwards become, have acquired any part of their growth and solidity. Hence it is evident, that the parts of the body which are furnished with the greatest quantity of nerves are those which appear the soonest, and which are the soonest brought to perfection.

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On the sixth day, she told us she saw better than on any preceding day; "but I cannot tell what I do see; I am quite stupid." She seemed indeed bewildered from not being able to combine the knowledge acquired by the senses of touch and sight, and felt disappointed in not having the power of distinguishing at once by her eye, objects which she could so readily distinguish from one another by feeling them.

On the seventh day, she took notice of the mistress of the house in which she lodged, and observed that she was tall. She asked what the colour of her gown was; to which she was answered that it was blue. "So is that thing on your head," she then observed, which was the case; "and your handkerchief, that is a different colour;" which was also correct. She added, "I see you pretty well, I think." The teacups and saucers underwent an examination. "What are they like?" her brother asked her. "I do n't know," she replied; "they look very queer to me; but I can tell you what they are in a minute if I touch them." She distinguished an orange on the chimney-piece, but could form no notion of what it was till she touched it. She seemed now to have become more cheerful, and entertained greater expectation of comfort from her admission into the visible world; and she was very sanguine that she would find her newly acquired faculty of more use to her when she returned home, where every thing was familiar to her.

On the eighth day, she asked her brother, when at dinner, what he was helping himself to; and when she was told it was a glass of port wine, she replied, "Port wine is dark, and looks to me very ugly." She observed, when candles were brought into the room, her brother's face in the mirror, as well as that of a lady who was present; she also walked, for the first time without assistance, from a chair to a sofa which was on the opposite side of the room, and back again to the chair. When at tea she took notice of the tray, observed the shining of the japan work, and asked, "What the colour was round the edge?" She was told it was yellow; upon which she remarked, "I shall know that again."

Eighteen days after the last operation had been performed, Mr. Wardrop attempted to ascertain by a few experiments her precise notions of colour, size, forms, positions, motions, and distances of external objects. As she could only see with one eye, nothing could be ascertained respecting the question of double vision. She evidently saw the difference of colours; that is, she received and was sensible of different impressions from different colours. When pieces of paper, one and a half inch square, differently coloured, were presented to her, she not only distinguished them at once from one another, but gave a decided preference to some colours, liking yellow most, and then pale pink. It may be here mentioned, that when desirous of examining an object, she had considerable difficulty in directing her eye to it, and finding out its position, moving her hand as well as her eye in various directions, as a person when blindfolded or in the dark gropes with his hands for what he wishes to touch. She also distinguished a large from a small object, when they were both held up before her for comparison. She said she saw different forms in various objects which were shown to her. On asking what she meant by different forms, such as long, round, and square, and desiring her to draw with her finger those forms on her other hand, and then presenting to her eye the respective forms, she pointed to them exactly; she not only distinguished small from large, but knew what was meant by above and below; to prove which, a figure, drawn in ink, was placed before her eye, having one end broad, and the other narrow, and she saw the positions as they really were, and not inverted. She could also perceive motions; for when a glass of water was placed on the table before her, on approaching her hand near it, it was moved quickly to a greater distance, upon which she immediately said, "You move it; you take it away."

She seemed to have the greatest difficulty in finding out the distance of any object; for when an object was held close to her eye, she would search for it by stretching her hand far beyond its position, while on other occasions she groped close to her own face for a thing far removed from her.

She learned with facility the names of the different colours, and two days after the coloured papers had been shown to her, on coming into a room, the colour of which was crimson, she observed that it was red. She also observed some pictures hanging on the red wall of the room where she was sitting, distinguishing several small figures in them, but not knowing what they represented, and admiring the gilt frames. On the same day she walked round the pond in St. James's Square, and was pleased with the glistening of the sun's rays on the water, as well as with the blue sky and green shrubs, the colours of which she named correctly.

It may be observed, that she had yet acquired by the use of her sight but very little knowledge of any forms, and was unable to apply the information gained by this new sense, and to compare it with what she had been accustomed to acquire by her sense of touch. When, therefore, the experiment was made of giving her a silver pencil case and a large key, to examine with her hands, she discriminated and knew each distinctly; but when they were placed on the table, side by side, though she distinguished each with her eye, yet she could not tell which was the pencil case and which was the key.

From this period till the time of her leaving London, on the 31st of March, being forty-two days after the operation, she had acquired a pretty accurate notion of colours, their different shades and names. Her knowledge of distance and of forms was very incomplete, and there was considerable difficulty in directing the eye to an object. She, however, entertained the hope, that when she got home, her knowledge of external things would be more accurate and intelligible, and that when she came to look at those objects which had so long been familiar to her touch, the confusion which the multiplicity of external objects now caused would in a great measure subside.

There is no other case on record of the sight being restored at such an advanced age. In the celebrated instance recorded by Cheselden, and quoted by Buffon, the boy received his sight at the age of fourteen. In that case, also, the boy could distinguish, before the operation, black, white, and scarlet, and when in a good light, he had that degree of sight which generally continues in an eye affected with cataract; whereas, in the lady whose case is here given, the pupil being completely closed, no light could reach to the retina, except such rays as could pass through the substance of the iris.

We judge of distance only by experience, otherwise, when experience does not set us right, the more distant an object is, the smaller it appears. When, from particular circumstances, we cannot form a just idea of distance, and when we cannot judge of objects but by the angle, or rather the image, which they form in our eyes, we are then necessarily deceived as to the size of such objects. Every man has experienced how liable we are in travelling by night to mistake a bush which is at hand for a tree which is at a distance, or indeed a tree which is at a distance for a bush which is at hand. In the same manner, if we do not distinguish objects by their form, and if thereby we cannot judge of distance, the same fallacy will still remain: in this case, a fly which is passing rapidly close before our eyes, will appear to be a bird at a considerable distance; and a horse which may be in the middle of a plain, without motion, and in an attitude similar, for example, to that of a sheep, will appear no larger than a sheep, till we have once discovered that it is a horse.

Whenever, therefore, we find ourselves benighted in an unknown place, where no judgment is to be formed of distance, we are every moment liable to deceptions of vision; hence originate, in part, the dreadful anecdotes of SPECTRES, and of those strange, hideous, and gigantic figures, which so many persons tell us they have seen. Though such appearances, it is commonly asserted, exist solely in the imagination, yet it is highly possible that they might appear literally to the eye, and be in every different respect seen as described to us. That this remark is consonant to truth will be allowed to be the more probable when we reflect, that whenever we cannot judge of an object except by the angle which it forms in the eye, this object is magnified in proportion to its nearness; and that, if it appeared at first to the spectator, who is alike incapable of distinguishing what he sees, and of judging at what distance he sees it; if it appeared, for instance, when at the distance of twenty or thirty paces, a few feet high, it must appear to him, when advanced to within a few feet of it, of a size stupendously increased. At this he must naturally be astonished and terrified, till he comes to touch the seemingly gigantic object, and to distinguish it; for in the very instant that he has an actual perception of what it is, the object will diminish, and appear to him as it in reality is. If, on the other hand, he is afraid to approach it, and he flies from the spot with precipitation, the only idea he will have of what had presented itself to him, will be that of the image that had been formed in his eye; the image of a figure he had seen, gigantic in its size and horrible in its form. The prejudice with respect to spectres, therefore, originates from nature; and such appearances depend not, as philosophers have supposed, solely upon the imagination.

The deception arising from the eye misjudging of magnitudes and distances is not, however, the only source of spectral illusions. Disease, particularly of the head, and violent excitement of the nervous system, often produce the most singular and vivid phantasms. Of this kind many cases are on record in the annals of medicine. One of the first that was brought to public notice, and one of the most remarkable, is that of M. Nicolai, the celebrated German bookseller, and member of the royal society of Berlin. It is related by himself. Nicolai had for years been subject to a congestion in the head, to relieve which he was frequently blooded by leeches.

"In the first two months of the year 1791 (says he) I was much affected in my mind by several incidents of a very disagreeable nature; and on the 24th of February a circumstance occurred which irritated me extremely. At ten o'clock in the forenoon my wife and another person came to console me; I was in a violent perturbation of mind, owing to a series of incidents which had altogether wounded my moral feelings, and from which I saw no possibility of relief: when suddenly I observed at the distance of ten paces from me a figure—the figure of a deceased person. I pointed at it, and asked my wife whether she did not see it. She saw nothing, but, being much alarmed, endeavoured to compose me, and sent for the physician. The figure remained some seven or eight minutes, and at length I became a little more calm; and, as I was extremely exhausted, I soon afterwards fell into a troubled kind of slumber, which lasted for half an hour. The vision was ascribed to the great agitation of mind in which I had been, and it was supposed I should have nothing more to apprehend from that cause; but the violent affection having put my nerves into some unnatural state, from this arose further consequences, which require a more detailed description.

"In the afternoon, a little after four o'clock, the figure which I had seen in the morning again appeared. I was alone when this happened; a circumstance which, as may be easily conceived, could not be very agreeable. I went, therefore, to the apartment of my wife, to whom I related it. But thither also the figure pursued me. Sometimes it was present, sometimes it vanished; but it was always the same standing figure. A little after six o'clock several stalking figures also appeared; but they had no connexion with the standing figure. I can assign no other reason for this apparition than that, though much more composed in my mind, I had not been able so soon entirely to forget the cause of such deep and distressing vexation, and had reflected on the consequences of it, in order, if possible, to avoid them; and that this happened three hours after dinner, at the time when the digestion just begins.

"At length I became more composed with respect to the disagreeable incident which had given rise to the first apparition; but though I had used very excellent medicines, and found myself in other respects perfectly well, yet the apparitions did not diminish, but, on the contrary, rather increased in number, and were transformed in the most extraordinary manner.

"After I had recovered from the first impression of terror, I never felt myself particularly agitated by these apparitions, as I considered them to be what they really were, the extraordinary consequences of indisposition; on the contrary, I endeavoured as much as possible to preserve my composure of mind, that I might remain distinctly conscious of what passed within me. I observed these phantoms with great accuracy, and very often reflected on my previous thoughts, with a view to discover some law in the association of ideas, by which exactly these or other figures might present themselves to the imagination. Sometimes I thought I had made a discovery, especially in the latter period of my visions; but, on the whole, I could trace no connexion which the various figures that thus appeared and disappeared to my sight had either with my state of mind or with my employment, and the other thoughts which engaged my attention. After frequent accurate observations on the subject, having fairly proved and maturely considered it, I could form no other conclusion on the cause and consequence of such apparitions than that, when the nervous system is weak, and at the same time too much excited, or rather deranged, similar figures may appear in such a manner as if they were actually seen and heard; for these visions in my case were not the consequence of any known law of reason, of the imagination, or of the otherwise usual association of ideas; and such also is the case with other men, as far as we can reason from the few examples we know.

"The origin of the individual pictures which present themselves to us must undoubtedly be sought for in the structure of that organization by which we think; but this will always remain no less inexplicable to us than the origin of those powers by which consciousness and fancy are made to exist.

"The figure of the deceased person never appeared to me after the first dreadful day; but several other figures showed themselves afterwards very distinctly; sometimes such as I knew; mostly, however, of persons I did not know; and amongst those known to me were the semblances of both living and deceased persons, but mostly the former; and I made the observation, that acquaintances with whom I daily conversed never appeared to me as phantasms; it was always such as were at a distance.

"When these apparitions had continued some weeks, and I could regard them with the greatest composure, I afterwards endeavoured, at my own pleasure, to call forth phantoms of several acquaintance, whom I for that reason represented to my imagination in the most lively manner, but in vain. For, however accurately I pictured to my mind the figures of such persons, I never once could succeed in my desire of seeing them *externally;* though I had some short time before seen them as phantoms, and they had perhaps afterwards unexpectedly presented themselves to me in the same manner. The phantasms appeared to me in every case involuntarily, as if they had been presented externally, like the phenomena in nature, though they certainly had their origin internally; and at the same time I was always able to distinguish with the greatest precision phantasms from phenomena. Indeed, I never once erred in this, as I was in general perfectly calm and self-collected on the occasion. I knew extremely well, when it only appeared to me that the door was opened, and a phantom entered, and when the door really was opened, and any person came in.

"It is also to be noted, that these figures appeared to me at all times, under the most different circumstances, equally distinct and clear. Whether I was alone or in company, by broad daylight equally as in the night-time, in my own as well as in my neighbour's house; yet when I was at another person's house they were less frequent, and when I walked the public street they very seldom appeared. When I shut my eyes, sometimes the figures disappeared, sometimes they remained even after I had closed my eyes. If they vanished in the former case, on opening my eyes again the same figures appeared which I had seen before.

"I sometimes conversed with my physician and my wife, concerning the phantasms which at the time hovered around me; for in general the forms appeared oftener in motion than at rest. They did not always continue present—they frequently left me altogether, and again appeared for a short or longer space of time, singly or more at once; but, in general, several appeared together. For the most part I saw human figures of both sexes; they commonly passed to and fro as if they had no connexion with each other, like people at a fair where all is bustle; sometimes they appeared to have business with one another. Once or twice I saw amongst them persons on horseback, and dogs and birds; these figures all appeared to me in their natural size, as distinctly as if they had existed in real life, with the several tints on the uncovered parts of the body, and with all the different kinds of colours of clothes. But I think, however, that the colours were somewhat paler than they are in nature.

"None of the figures had any distinguishing characteristic; they were neither terrible, ludicrous, nor repulsive: most of them were ordinary appearances—some were even agreeable.

"On the whole, the longer I continued in this state, the more did the number of phantasms increase, and the apparitions become more frequent. About four weeks afterwards I began to hear them speak: sometimes the phantasms spoke with one another, but for the most part they addressed themselves to me: those speeches were in general short, and never contained any thing disagreeable. Intelligent and respected friends often appeared to me, who endeavoured to console me in my grief, which still left deep traces in my mind. This speaking I heard most frequently when I was alone; though I sometimes heard it in company, intermixed with the conversation of real persons; frequently in single phrases only, but sometimes even in connected discourse.

" Though at this time I enjoyed rather a good state of health both in body and mind, and had become so very familiar with these phantasms, that at last they did not excite the least disagreeable emotion, but on the contrary afforded me frequent subjects for amusement and mirth; yet as the disorder sensibly increased, and the figures appeared to me for whole days together, and even during the night if I happened to awake, I had recourse to several medicines, and was at last again obliged to have recourse to the application of leeches.

"This was performed on the 20th of April, at eleven o'clock in the forenoon. I was alone with the surgeon, but during the operation the room swarmed with human forms of every description, which crowded fast one on another; this continued till half past four o'clock, exactly the time when the digestion commences. I then observed that the figures began to move more slowly; soon afterwards the colours became gradually paler, and every seven minutes they lost more and more of their intensity, without any alteration in the distinct figure of the apparitions. At about half past six o'clock all the figures were entirely white, and moved very little; yet the forms appeared perfectly distinct; by degrees they became visibly less plain, without decreasing in number, as had often formerly been the case. The figures did not move off, neitheir did they vanish, which also had usually happened on other occasions. In this instance they dissolved immediately into air; of some even whole pieces remained for a length of time, which also by degrees were lost to the eye. At about eight o'clock there did not remain a vestige of any of them, and I never since experienced any appearance of the same kind. Twice or thrice since that time I have felt a propensity, if I may be so allowed to express myself, of a sensation, as if I saw something which in a moment again was gone. I was even surprised by this sensation whilst writing the present account, having, in order to render it more accurate, perused the papers of 1791, and recalled to my memory all the circumstances of that time. So little are we sometimes, even in the greatest composure of mind, masters of our imagination."

As the sense of sight is the effect of the action of light upon the eye, it is well known that too much light is extremely prejudicial, as well as too little.* Travellers, who cross countries covered with snow, are obliged to wear a crape before their eyes. Persons, therefore, who read or write much should accustom themselves to a moderate light.

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* It is, however, surprising how far the eye can accommodate itself to darkness, and make the best of a gloomy situation. When first taken from the light and brought into a dark room, all things disappear; or, if any thing is seen, it is only the remaining radiations that still continue in the eye. But, after a very little time, when these are spent, the eye takes advantage of the smallest ray that happens to enter; and this alone would in time serve for many of the purposes of life. There was a gentleman of great courage and understanding, who was a major under King Charles the First. This unfortunate man sharing in his master's misfortunes, and being forced abroad, ventured, at Madrid, to do his king a signal service; but un-

There are many reasons to induce us to suppose that such persons as are short-sighted see objects larger than others; and yet it is a certain truth that they see them less.

Error is however not confined to any one sense; and that of HEARING is liable to similar mistakes with that of sight. This sense conveys no distinct intelligence of the distance whence a sounding body is heard: a great noise far off, and a small one very near, produce the same sensation; and, unless we receive information from some other sense, we can never distinctly tell whether the sound be a great or a small one. It is not till we have, by experience, become acquainted with any particular sound, that we can judge of the distance when we hear it. When, for example, we know the tone of a bell, we are then at no great loss to determine how far it is from us.

luckily failed in the attempt. In consequence of this he was instantly ordered to a dark and dismal dungeon, into which the light never entered, and into which there was no opening but by a hole at the top; down which the keeper put his provisions, and presently closed it again on the other side. In this manner the unfortunate loyalist continued for some weeks, distressed and disconsolate; but, at last, began to think he saw some little glimmering light. This internal dawn seemed to increase from time to time, so that he could not only discover the parts of his bed, and such other large objects, but, at length, he even began to perceive the mice that frequented his cell; and saw them as they ran about the floor, eating the crumbs of bread that happened to fall. After some months confinement, he was at last set free; but such was the effect of the darkness upon him, that he could not for some days venture to leave his dungeon, but was obliged to accustom himself by degrees to the light of the day.

The air is the principal means of conveying the sound.* Sound is in effect always a vibration, or wave-like motion, communicated by other bodies to the air, and to our senses by the air striking on our auditory nerve.

Every body that strikes against another produces a sound, which is simple in such bodies as are not elastic, but which is often repeated in such as are. If we strike a bell, for instance, a single blow produces a sound, which is repeated by the undulations of the sonorous body, and which is multiplied as often as it happens to undulate or vibrate. These undulations succeed each other so fast, that the ear supposes them one continued sound; whereas, in reality, they form many sounds. Sounding bodies are therefore of two kinds; those unelastic ones, which being struck, return but a single sound; and those more elastic, returning a succession of sounds, which uniting together form a tone. This tone may be considered as a great number of sounds, all produced one after the other, by the same body, as we find in a bell which continues to sound for some time after it is struck. A continuing tone may be also produced from a non-elastic body, by repeating the blow quick and often, as when we beat a drum, or when we draw a bow along the string of a fiddle.

To know the manner in which musical sounds become pleasing, it must be observed, that no one continuing tone, how loud or swelling so ever, can give us satisfaction; we must have a succession of them, and those in the most pleasing proportion. The nature of this proportion may be thus conceived. If we strike a body incapable of vibration with a double force, or what amounts to the same thing, with a double mass of matter, it will produce a sound that will be doubly grave. Music has been said, by the ancients, to have been first invented from the blows of different hammers on an anvil. Suppose then we strike an anvil with a hammer of one pound weight, and again with a hammer of two pounds, it is plain that the two pound hammer will produce a sound twice as grave as the former. But if we strike with a two pound hammer, and then with a three pound, it is evident that the latter will produce a sound one third more grave than the former. If we strike the anvil with a three pound hammer, and then with a four pound, it will likewise follow that the latter will be a quarter part more grave than the former. Now, in comparing all those sounds, it is obvious that the difference between one and two is more easily perceived than between two and three, three and four, or any numbers succeeding in the same proportion. The succession of sounds will be, therefore, pleasing in proportion to the ease with which they may be distinguished. That sound which is double the former, or, in other words, the octave to the preceding tone, will among all others be the most pleasing harmony. The next to that, which is as two to three, or, in other words, the third, will be most agreeable. And thus universally, those sounds whose differences may be most easily compared are the most agreeable.

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* The strokes of a bell give no sound, when it is placed under the receiver of an air-pump, which is exhausted of its air.

Sound has, in common with light, the property of being extensively diffused. Like light, it also admits of reflection. The laws of this reflection, it is true, are less distinctly understood than those of light: all we know is, that sound is principally reflected by hard bodies, and that their being hollow also sometimes increases the reverberation. The internal cavity of the ear, which is fashioned out in the temporal bone, like a cavern cut into a rock, seems to be fitted for the purposes of echoing sound with the greatest precision.

One of the most common complaints in old age is deafness; which probably proceeds from the rigidity of the nerves in the labyrinth of the ear. This disorder also proceeds sometimes from a stoppage of the wax, which art may easily remedy. In order to know whether the defect be an internal or an external one, let the deaf person put a repeating watch into his mouth, and if he hears it strike, he may be assured that his disorder proceeds from an external cause, and may be in some measure cured.

It often happens that people hear better with one ear than another; and these, it is observed, have what musicians call a bad ear. I have made many trials on persons thus circumstanced; and I have always found that their defect in judging properly of sounds proceeds from the inequality of their ears, and their receiving, by both at the same time, unequal sensations. In like manner, as such persons hear false, they also without knowing it, sing false. They also frequently deceive themselves with regard to the side whence the sound comes, generally supposing the noise to come on the part of the best ear.

Hearing is a much more necessary sense to a man than to animals. In these it is only a warning against danger, or an encouragement to mutual assistance. In man, it is the source of most of his pleasures; and without it the rest of his senses would be of little benefit. A man born deaf, must necessarily be dumb; and his whole sphere of knowledge must be bounded by sensual objects. We have a singular, and perhaps an unexampled instance of a young man, who, being born deaf, was restored, at the age of twenty-four, to perfect hearing. The account, which is given in the memoirs of the Academy of Sciences, 1703, page 18, is in substance as follows:

"A young man of the town of Chartres, between the age of twenty-three and twenty-four, the son of a tradesman, and deaf and dumb from his birth, began to speak all of a sudden, to the utter astonishment of the whole town. He gave them to understand that, about three or four months before, he had heard the sound of the bells, and was greatly surprised at this new and unknown sensation. After some time, a kind of water issued from his left ear, and he then heard perfectly well with both. During these three months he was sedulously employed in listening without saying a word, and accustoming himself to speak softly, so as not to be heard, the words pronounced by others. He laboured hard also in perfecting himself in the pronunciation, and in the ideas attached to every sound. At length, having supposed himself qualified to break silence, he declared that he could now speak, though as yet but imperfectly. Soon after, some able divines questioned him concerning his ideas of his past state; and principally with respect to God, his soul, the moral beauty of virtue, and deformity of vice. The young man, however, had not directed his solitary speculations into that channel. He had gone to mass indeed with his parents, had learned to sign himself with the cross, to kneel down, and to assume all the grimaces of a man in the act of devotion. But he did all this without any manner of knowledge of the intention or the cause; he saw others do the like, and that was enough for him. He knew nothing even of death, nor did it ever enter into his mind. He led a life of pure animal instinct; and though entirely taken up with objects of sense, and such as were present, he did not seem to have made such reflections even upon these, as might reasonably have been expected. The young man was not, however, deficient in understanding; but the understanding of a man, deprived of all commerce with others, is so very confined, that the mind is in some measure totally under the control of its immediate sensations."

It is highly possible, nevertheless, to communicate ideas to deaf men, which they previously wanted, and even to give them very precise notions of abstract and general subjects, by means of signs and of letters. A person born deaf, may, by time and application, be taught to read, to write, and even, by the motions of the lips, to understand what is said to him; a plain proof how much the senses resemble, and may supply the defects of each other. It is probable, however, that, as most of the motions of speech are made within the mouth by the tongue, the knowledge from the motion of the lips, can be but very confined.

The sense of FEELING is spread over the whole body, but it employs itself differently in different parts. The sentiment which results from feeling cannot be excited otherwise than by the contact and immediate application of the superficies of some foreign body to that of our own. If we apply a foreign body against the breast, or upon the shoulder of a man, he will feel it; that is, he will know that there is a foreign body which touches him: but he will not have a single idea of the form of this body, because the breast touching the body in a single plane, or surface, he cannot gather from it any knowledge of this body. It is the same with respect to all other parts of the body, which cannot adjust themselves upon the surface of foreign bodies, and bend themselves to embrace, at one time, many parts of their superficies. These parts of our body cannot, therefore, give any just idea of their form; but those which, like the hand, are divided into many small flexible and moveable parts; and which, consequently, can apply themselves, at one and the same time, upon the different planes of the superficies of the body, are those, which, in effect, give us the ideas of their form and of their size.

It is not, therefore, only because there is a greater quantity of nervous tufts, at the extremity of the fingers than in any other part of the body—it is not, as it is vulgarly pretended, because the hand has the most delicate sense—that it is in effect the principal organ of feeling; on the contrary, we can say, that there are parts more sensible, and where the sense of feeling is more delicate, as the eyes, the tongue, &c. but it is merely because the hand is divided into many parts, all moveable, all flexible, all acting at one and the same time, and all obedient to the will; it is because the hand is the only organ which gives us distinct ideas of the form of bodies. Animals which have hands appear to be the most acute: apes do things so resembling the mechanical actions of man, that it seems as if they had the same succession of corporeal sensation for the cause of them. Animals, which are deprived of this organ cannot have any knowledge distinct enough of the form of things; as they cannot grasp any object, and as they have not any part divided and flexible enough to be able to adjust itself upon the superficies of bodies, they certainly have not any precise notion of the form, any more than of the size of them. It is for this reason that we often see them in suspense, or frightened, at the aspect of objects with which they ought to be the best acquainted, and which are the most familiar to them. The principal organ of their feeling is the muzzle, because this part is divided in two by the mouth, and because the tongue is another part, that serves them at the same time to touch bodies, which we see them turn and turn again before they take them between their teeth.

It is therefore to the sense of feeling that we are indebted for the power of usefully exercising all our other faculties. One man does not, perhaps, possess more ingenuity or capacity than another; but because in his earliest infancy he made a greater and a readier use of this sense. As soon as children are indulged with the liberty of their hands, they presently bring them into action, and are fond of touching whatever is presented to them. They are seen to amuse themselves, and take pleasure in handling every thing they are capable of grasping: they seem as if they were endeavouring to find out the form of bodies, by touching them on every side; and for a considerable time, they amuse themselves in this manner, or rather they inform themselves of new objects. In the rest of our life, we ourselves, if we reflect upon it, amuse ourselves in a different method, in doing, or in seeking to do, any thing that is new.

Of the senses of SMELLING and TASTING there is little to be said worthy of observation. It is evident, that with respect to the first of these, there are animals which are infinitely superior to man; and perhaps there may exist creatures which, in delicacy of taste, may as much surpass the voluptuary, as the beagle does in acuteness of scent.

CHAP. VI.

Of the apparent Varieties of the Human Species...Laplanders...Tartars...Chinese...Japanese....Formosans....Moguls.... Persians....Arabians....Egyptians....Circassians....Turks.... Russians....Negroes....Hottentots....Americans....Causes of this Variety...Accidental Varieties...White and Pied Negroes....Albinos....The Porcupine Man....Curious Child... Negro that from Black became White...Dwarfs...Curious Wedding...History of Baby...Giants...Narrative of extraordinary Twins...Siamese Youths.

THERE are many causes which contribute to the producing of an apparent variety between the different nations of the globe. Climate, food, manners, and customs, produce not only a difference in sentiment, but even in the external form of a different people.

In examining the surface of the earth, and beginning our inquiries from the north, we find in Lapland, and in the northern parts of Tartary, a race of small-sized men, whose figure is uncouth, and whose physiognomy is as wild as their manners are unpolished. Though they seem to be of a degenerate species, they yet are numerous, and the countries they occupy are extensive.

The LAPLANDERS, the Danes, the Swedes, the Muscovites, the inhabitants of Nova Zembla, the Samoyedes, the Ostiacs of the old continent, the Greenlanders, and the savages to the north of the Esquimaux Indians of the new continent, appear to be of one common race, which has been extended and multiplied along the coasts of the northern seas, and over deserts considered as uninhabitable by every other nation. In these countries, the visage is large and broad, the nose is flat and short, the eyes are of a yellowish brown inclining to black, the eyelids are drawn towards the temples, the cheek bones are extremely prominent, the mouth is very large, the lower part of the countenance is very narrow, the lips are thick and turned outward, the voice is shrill, the head is bulky, the hair is black and straight, and the skin is tawny. The Laplanders are small in stature, and, though meagre, they yet are of a squat form. In general, their size is about four feet, nor do the tallest exceed four feet and a half; and among these people, if there is any difference to be found, it depends on the greater or less degree of deformity.

The Danish Laplanders have a large black cat, which they make a confident of all their secrets, and a counsellor in all their difficulties. Among the Swedish Laplanders, there is in every family a drum for the purpose of consulting the devil; and though the natives of these countries are robust and nimble, there is reason to suppose, from many circumstances, that they cannot live but in their own country, and in their own manner. In travelling over the ice and snow, they use skates made of fir, which are in length about two feet, and in breadth about half a foot, and which are raised and pointed before, and fastened to the foot by straps of leather. With these they make such despatch, that they easily overtake the swiftest animals. They also use a pole, pointed with iron at one end, and rounded at the other. This pole serves to push them along, to direct their course, to keep them from falling, to stop the impetuosity of their career, and to kill what game they overtake. With their skates they descend the steepest mountains, and scale the most craggy precipices; nor are the women less skilful in such exercises than the men. They are all accustomed to the bow and arrow; and it is asserted, that the Muscovite Laplanders launce a javelin with so much dexterity, that at the distance of thirty paces, they are sure to hit a mark no larger than a silver crown, and with such force, that it will transfix a human body. As hunters, their favourite pursuit is that of the ermine, the fox, the lynx, and the martin; and they barter the skins of these animals for their favourite articles of luxury, brandy and tobacco.

In winter the Laplanders clothe themselves with the skin of the rein-deer, and in summer with the skins of birds. To the use of linen they are utter strangers. The women of Nova Zembla have their nose and their ears pierced, in order to have them ornamented with pendants of blue stone; and, as an additional lustre to their charms, they also form blue streaks upon their forehead and chin. Those of Greenland dress themselves with the skin of the dog-fish: they also paint the visage with blue and yellow colours, and wear pendants in the ears. They all live under ground, or in huts almost entirely covered with earth, and with the bark of certain trees, or the skins of certain fishes; and some form subterranean trenches, by which one hut communicates to another, and by which, during the winter months, they enjoy the conversation and society of their neighbours. A continued darkness for several months, obliges them to illuminate their dreary abode with lamps, which they keep alive with that very train oil they use as drink. Under all these hardships they are subject to few diseases, and live to a prodigious age. So vigorous indeed are the old men, that they are hardly to be distinguished from the young. The only infirmity they experience, and it is an infirmity common to them all, is that of blindness. Dazzled as they perpetually are by the strong reflection of the snow in winter, and enveloped in clouds of smoke in autumn and spring, rarely, when advanced in years, are they still found to retain the use of their eyes.

The TARTAR country, taken in general, comprehends the greatest part of Asia, and in fact extends from Russia to Kamtschatka. In length it occupies from eleven to twelve hundred leagues, and in breadth from seven hundred to seven hundred and fifty, a circumference twenty times larger than that of the whole kingdom of France.

All the Tartar nations have the upper part of the visage very large and wrinkled, even while yet in their youth. Their nose is short and flat, their eyes are little, and sunk in the head; their cheek bones are high; the lower part of their visage is narrow; their chin is long and prominent; their teeth are long and straggling; their eyebrows are so large as to cover the eyes; their eyelids are thick; their face is broad and flat; their complexion is tawny; and their hair is black. They have but little beard, have thick thighs, and short legs, and, though but of middling stature, they yet are remarkably strong and robust. The ugliest of them are the Calmucks, in whose appearance there seems to be something frightful. They are all wanderers; and their only shelter is that of a tent made of hair or skins. Their food is horse-flesh and camel-flesh, either raw, or a little sodden between the horse and the saddle. They eat also fish dried in the sun. Their most common drink is mare's milk, fermented with millet ground into meal. They all have the head shaved, except a tuft of hair on the top, which they let grow sufficiently long to form into tresses on each side of the face. The women, who are as deformed as the men, wear their hair, which they bind up with bits of copper, and other ornaments of the same nature.

The majority of these tribes are alike strangers to religion, morality, and decency. They are robbers by profession; and the natives of Daghestan, who live in the neighbourhood of more polished countries, carry on a great traffic of slaves, whom they carry off by force, and afterwards sell to the Turks and the Persians. Their wealth consists chiefly of horses, which are more numerous, perhaps, in Tartary, than in any other part of the world. They are taught, by custom, to live in the same place with their horses; they are continually employed in training and exercising them; and at length they reduce them to such implicit obedience, that they actually appear to understand, as it were, the intention of their riders.

Some travellers tell us, that the limbs of the CHINESE are well proportioned, that their body is large and fat, their visage large and round, their eyes small, their eyebrows large, their eyelids turned upwards, their nose short and flat; that, as for their beard, which is black, upon the chin there is very little, and upon each lip there are not more than seven or eight prickles: that those who inhabit the southern provinces of the empire, are more brown and tawny than the others; that, in colour they resemble the natives of Mauritania, and the more swarthy Spaniards; but that those who inhabit the middle provinces are as fair as the Germans.

Le Gentel assures us, that the Chinese women do every thing in their power to make their eyes appear little, and oblong; that, for this purpose, it is a constant practice with the little girls, from the instruction of the mother, forcibly to extend their eyelids; and that, with the addition of a nose thoroughly compressed and flattened, of ears long, large, open, and pendant, they are accounted complete beauties. He adds, that their complexion is delicate, their lips are of a fine vermilion, their mouth is well proportioned, their hair is very black; but that, by the use of paint, they so greatly injure their skin, that before the age of thirty, they have all the appearance of old age.

So strongly do the JAPANESE resemble the Chinese, that we can hardly scruple to rank them in the same class. They only differ from them in being more yellow, or more brown. In general, their stature is contracted, their face as well as their nose is broad and flat, their hair is black, and their beard is little more than perceptible. They are haughty, fond of war, full of dexterity and vigour, civil and obliging, smooth-tongued, and courteous, but fickle and vain. With astonishing patience, and even almost regardless of them, they sustain hunger, thirst, cold, heat, fatigue, and all other hardships of life. Their ceremonies, or rather their grimaces, in eating, are numerous and uncouth. They are laborious, are very skilful artificers, and, in a word, have nearly the same disposition, the same manners and the same customs as the Chinese.

One custom which they have in common, and which is not a little fantastic, is, so to contract the feet of the women, that they are hardly able to support themselves. Some travellers mention, that in China, when a girl has passed her third year, they break the foot in such a manner, that the toes are made to come under the sole; that they apply to it a strong water, which burns away the flesh; and, that they wrap it up in a number of bandages, till it has assumed a certain fold. They add, that the women feel the pain of this operation all their lives; that they walk with great difficulty; and that their gait is to the last degree ungraceful. Other travellers do not say that they break the foot in their infancy, but that they only compress it with so much violence as to prevent its growth; but they unanimously allow, that every woman of condition, and even every handsome woman, must have a foot small enough to enter, with ease, the slipper of a child of six years old.

Though the inhabitants of the kingdom of Pegu and Aracan are blacker, yet they all bear a considerable resemblance to the Chinese. Those of Aracan place great value upon a forehead large and flat; and, in order to render it so, they apply a plate of lead to the forehead of their children, the minute they are born. Their nostrils are large and extended; their eyes are small and lively; and their ears are of such a length as to hang over their shoulders. They feed without disgust on mice, on rats, on serpents, and on fish, however corrupted. Their women are tolerably fair, and their ears are as long as those of the men. The people of Achan, who are situated farther to the north than those of Aracan, have also a flat visage, and an olive-coloured skin; and such is the want of refinement, that they allow their boys to go quite naked, and their girls with only a slight plate of silver over those parts which nature dictates to conceal.

Northward of the Philippine Islands is situated the island of Formosa, of which the natives, though situated at no great distance from the coast of Fokien in China, discover, however, no resemblance to the Chinese. According to Struys, the Formosans are of small stature, those particularly who inhabit the mountains, and their visage is broad. The women have large and full breasts, and a beard like the men; their ears, naturally long, they render still more so by certain thick shells, which they wear as pendants; their hair is very black, and very long, and their complexion is of different shades of yellow. These islanders, though averse to labour, are yet admirably skilled in the use of the javelin and bow; they are also excellent swimmers; and when they run, their swiftness is incredible.

The Moguls (Hindoos), and the other inhabitants of the peninsula of India, are not unlike the Europeans in shape and in features; but they differ more or less from them in colour. The Moguls are of an olive complexion; and yet, in the Indian language, the word *Mogul* signifies *White*. The women are extremely delicate, and they bathe themselves very often: they are of an olive colour, as well as the men; and contrary to what is seen among the women of Europe, their legs and thighs are long, and their body is short. Tavernier says, that, after passing Lahor, and the kingdom of Cashmire, the women have naturally no hair on any part of the body, and the men have hardly any beard. According to Thevenot, the Mogul women are tolerably fruitful, though exceedingly chaste. They likewise suffer little from the pains of child-birth, and are often known to be up and abroad the day following. He adds, that in the kingdom of Decan they are allowed to marry, the husband by his tenth, and the wife by her eighth year; and at that age they not unfrequently have children.

The women who become mothers so soon, usually cease bearing, however, before they arrive at thirty; and by that period, they appear wrinkled, and marked with all the deformities of age.

The customs of the different nations of India are all very singular, if not whimsical. The Banians eat nothing which has had life in it; they are even afraid to kill the smallest reptile, however offensive to them; they throw rice and beans into their rivers, as food for the fishes, and grain of different kinds upon the earth, for the birds and insects. When they meet with a hunter, or a fisher, they beg of him instantly to desist from his employment; if deaf to their entreaties, they offer him money for his gun, or nets; and when no persuasion, no offer will avail, they trouble the water, in order to frighten away the fishes, and cry with all their might, in order to put the birds and other game to flight.*

In Ceylon there is a species of savages, who go by the name of *Bedas*, and who occupy a small district on the northern part of the island. These Bedas seem to be totally different from all the nations around them. The spot they inhabit is entirely covered with wood, amidst which they keep themselves so closely concealed, that it is with great difficulty they are discovered. They do not speak the language of Ceylon; nor indeed has the language they do speak the smallest affinity to that of any of the other Indians. They have no villages, no houses, no intercourse with the rest of mankind. Their arms are the bow and the arrow, with which they destroy a number of boars, stags, and other animals; and though they never dress their meat, they yet sweeten it with honey, which they possess in great abundance.

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* At Surat, there is a Banian hospital for animals of all kinds, in which there is an extraordinary ward for rats, mice, bugs, &c.; and Forbes, in his Oriental Memoirs, states, that beggars are hired to pass the night at this institution, to afford a feast to the fleas, lice, and bugs! This is, indeed, carrying to its full extent the poet's principle to "feel for *all* that lives!" ED.

The inhabitants of PERSIA, of Turkey, of Arabia, of Egypt, and of the whole of Barbary, may be considered as one and the same people, who, in the time of Mahomet, and of his successors, invaded immense territories, extended their dominions, and became exceedingly intermixed with the original natives of all those countries. The Persians, the Turks, and the Moors are to a certain degree civilized; but the ARABIANS have, for the most part, remained in a state of independence, which implies a contempt of laws. They live, like the Tartars, without order, without government, and almost without society: theft, robbery, and violence are authorized by their chiefs; they glory in their vices; to virtue they pay not the smallest respect; and of all human conventions, those only have they admitted, which owe their existence to fanaticism, and to superstition.

They are a people highly inured to labour; and to labour they take especial care to habituate also their horses. They allow this animal to eat and drink but once in twenty-four hours, and though their horses are necessarily meagre, they yet are excellent coursers, and seem, as it were, indefatigable.

The EGYPTIAN women are very brown; their eyes are lively; their stature is rather low; their mode of dress is by no means agreeable; and their conversation is extremely tiresome. But though the women of Egypt are commonly rather short, yet the men are of a good height. Both, generally speaking, are of an olive colour; and the more we remove from Cairo, the more we find the people tawny, till we come to the confines of Nubia, where they are as black as the Nubians themselves.

The most inherent defects of the Egyptians are idleness and cowardice. They do nothing almost the whole day but drink coffee, smoke, sleep, remain indolent in one place, or chatter in the streets. They are highly ignorant, and are full of the most ridiculous vanity. Though they cannot deny but that they have lost every thing noble they once possessed; the sciences, the exercise of arms, their history, and even their language; and that, from an illustrious and valiant nation, they have become a people dastardly and enslaved; they yet scruple not to despise all other nations, and to take offence at the bare offer of carrying their children into Europe, in order to give them a knowledge of the arts and sciences.

"The women of CIRCASSIA," says Struys, "are exceedingly fair and beautiful. Their complexion is incomparably fine; their forehead is large and smooth; and without the aid of art, their eyebrows are so delicate, that they appear as threads of silk. Their eyes are large, soft, and yet full of animation; their mouth is small and expressive of a smile, and their chin, what it ought to be in order to form a perfect oval. Their neck and breasts are admirably formed; their stature is tall, and the shape of their body easy; their skin is white as snow, and their hair of the most beautiful black. They wear a little cap of a black stuff, over which is fastened a roller of the same colour; but what is truly ridiculous, is, that, instead of this roller, the widows wear the bladder of an ox, or a cow, inflated as much as possible, by which they disfigure themselves amazingly. In the summer months, the inferior classes wear nothing but a shift, which is open down to the middle, and which is generally of a blue, yellow, or red colour. They are tolerably familiar with strangers, but at the same time faithful to their husbands, who are by no means inclined to be jealous of them."

The **Turks**, who purchase a vast number of those women as slaves, are a people composed of many different nations. From the intermixture, during the crusades, of the Armenians, the Georgians, and the Turcomans, with the Arabians, the Egyptians, and even the Europeans, it is hardly possible to distinguish the native inhabitants of Asia Minor, of Syria, and of the rest of Turkey. All we can observe is, that the Turkish men are generally robust, and tolerably well made; that it is even rare to find among them persons either hump-backed or lame; that the women are also beautiful, well proportioned, and free from blemishes; that they are very fair, because they seldom stir from home; and that, when they do go abroad, they are always veiled.

Before the Czar Peter I. we are told, the **Muscovites** had not merged from barbarism. Born in slavery, they were ignorant, brutal, cruel, without courage, and without manners. Men and women bathed promiscuously in bagnios heated to a degree intolerable to all persons but themselves; and on quitting this warm bath, they plunged, like the Laplanders, into cold water. Their food was homely; and their favourite dishes were cucumbers, or melons, of Astracan, which, in summer, they preserved in a mixture of water, flour, and salt. From ridiculous scruples they refrained from the use of several viands, amongst which were pigeons and veal. Yet, even at this period of unrefinement, the women were skilled in the arts of colouring the skin, of plucking out the eyebrows, and of painting artificial ones. They also adorned themselves with pearls and jewels, and their garments were made of rich and valuable stuffs. From these circumstances does it not appear, that the barbarism of the Muscovites was near a close, and that their sovereign had less trouble in polishing them than some authors have endeavoured to insinuate? They are now a people in some degree civilized and commercial, fond of spectacles, and of other ingenious novelties.

From the regions of Europe and Asia, our attention is now to be directed to a race of people differing more from ourselves in external appearances than any that has been hitherto mentioned.

In the seventeenth or eighteenth degree of north latitude, on the African coast, we find the NEGROES of Senegal and of Nubia, some in the neighbourhood of the ocean, and others of the Red Sea; and after them, all the other nations of Africa, from the latitude of eighteen north to that of eighteen south, are black, the Ethiopians, or Abyssinians excepted. It appears, then, that the portion of the globe which Nature has allotted to this race of men, contains an extent of ground, parallel to the equator, of about nine hundred leagues in breadth, and considerably more in length, especially northward of the equator. Beyond the latitude of eighteen or twenty, there are no longer any Negroes, as will appear when we come to speak of the Caffres and of the Hottentots.

By confounding them with their neighbours the Nubians, we have been long in an error, with respect to the colour, and the features of the ETHIOPIANS. Marmol says, that the Ethiopians (Abyssinians) are absolutely black, that their visage is large, and their nose flat; and in this description the Dutch travellers agree with him. The truth, however, is, that they differ from the Nubians, both in colour and in features. The skin of the Ethiopians is brown, or olive-coloured, like that of the southern Arabians, from whom, it is probable, they derive their origin. In stature they are tall; the features of their countenance are strongly marked; their eyes are large and beautiful; their nose is well proportioned; their lips are thin; and their teeth are white. Of the inhabitants of Nubia, on the contrary, the nose is flat, the lips are thick and prominent, and the countenance is exceedingly black. These Nubians, as well as the Barbarians, their western neighbours, are a species of Negroes not unlike those of Senegal.

The Ethiopians are a people between the extremes of barbarism and of civilization. Their garments are of cotton, though those of the more opulent are of silk: their houses are low, and of a bad construction; their lands, too, are wretchedly neglected. These circumstances are owing to the behaviour of their nobles, who despise, maltreat, and plunder, as far as in them lies, the tradesmen and the common people. Each of these classes, however, lives separate from the other, and has its own villages or hamlets. Unprovided with salt at home, they purchase it from abroad for its weight in gold. So fond are they of raw meat, that, at their feasts, the second course, which they consider as the most delicate, consists of it entirely. Though they have vines, they yet have no wine; and their usual beverage is a sour composition made with tamarinds. They use horses for the purpose of travelling, and mules for that of carrying their merchandise. Of the arts or sciences they have little knowledge; their language is without rules; and their manner of writing, though their characters are more beautiful than those of the Arabians, is so imperfect, that, in order to finish an epistle, they require several days. In their mode of salutation there is something exceedingly whimsical. Each takes the right hand of the other and carries it to his mouth; this done, the saluter takes off the scarf of the person saluted, and fastens it round his own body; so that the latter is left half naked, few of the Ethiopians wearing any thing more than this scarf, and a pair of cotton drawers.

The first Negroes we meet with, are those who live on the south side of Senegal. These people, as well as those who occupy the different territories between Senegal and Gambia, are called *Jalofes*. They are all very black, well proportioned, and of a size sufficiently tall. Their features are less harsh than those of the other Negroes; and some of them there are, especially among the female sex, whose features are far from irregular. Among them, to be perfectly beautiful the colour must be exceedingly black, and exceedingly glossy: their skin, however, is highly delicate and soft; and colour alone excepted, we find among them women as handsome as in any other country in the world. They are usually very gay, lively, and amorous.

Father du Tertre says expressly, that, if the Negroes are for the most part flat nosed, it is because the parents crush the noses of their children; that in the same manner they compress their lips, in order to render them thicker; and that of the few who have undergone neither of these operations, the features of the countenance are as comely, the nose is as prominent, and the lips are as delicate as those of the Europeans. It appears, however, that among the Negroes in general, thick lips and a nose broad and flat, are gifts from Nature, by which was originally introduced, and at length established, their custom of flattening the nose and thickening the lips of such as at their birth discovered a deficiency in these ornaments. Though the Negroes of Guinea are in general very healthy, yet they seldom attain what we term old age.

The Negroes in general are a remarkably innocent and inoffensive people. If properly fed, and unexposed to bad usage, they are contented, joyous and obliging; and on their very countenances may we read the satisfaction of their souls. If hardly dealt with, on the other hand, their spirits forsake them, and they droop with sorrow. Alike impressed with a sense of the injuries, and of the favours they have received, to a cruel master they are implacable foes: to an indulgent one, servants who will exert every effort of which human nature is capable, in order to express to him their zeal and their attachment. To their children, their friends, their countrymen, they are naturally compassionate and tender; cheerfully, of the little they have, do they communicate a share to those who are in necessity or in indigence, though otherwise than from that necessity, that indigence, they have not, perhaps, the smallest knowledge of them. That they have an excellent heart, therefore, is evident; and in having this, they have the seed of every virtue. Their sufferings demand a tear. Are they not already sufficiently unhappy, in being reduced to a state of slavery; in being obliged always to work, without ever reaping the smallest fruits of their labour? To crown their wretchedness, must they be abused, buffeted, treated like brutes? Humanity revolts at the idea of a conduct, which nothing but the thirst of gold could ever have introduced, and of which, from that thirst, every day will still, perhaps, produce an aggravated repetition, till an enlightened legislature shall put an end to a traffic which disgraces human nature.

Mr. Kolben, though he has given so minute a description of the HOTTENTOTS, is strongly of opinion, however, that they are Negroes. Like that of the latter, he assures us, their hair is short, black, frizzled and woolly; nor in a single instance did he ever observe it long.

Though of all the Hottentots the nose is very flat, and very broad, yet it would not be of that form, did not their mothers, considering a prominent nose as a deformity, think it a duty incumbent upon them to crush it presently after their birth. Their lips are also thick, and their upper lip is particularly so; their teeth are very white; their eyebrows are thick; their head is large; their body is meagre; their limbs are slender. They seldom live longer than forty years; and of this short duration of life, the causes doubtless are, their being so fond of filth, and residing continually in the midst of it; as also their living upon meat which is tainted or corrupted, of which indeed their nourishment chiefly consists. I might dwell longer upon the description of this nasty people; but as most travellers have given very large accounts of them, to their writings I refer. One fact, however, related by Tavernier, I ought not to pass in silence. The Dutch, he says, once took a Hottentot girl, soon after her birth; and after bringing her up among themselves, she became as white as an European. From this circumstance he presumes, that all the Hottentots would be of a tolerable whiteness, were it not for their custom of perpetually begriming themselves.

Though in AMERICA we observe less variety in the human form than might be expected in so extremely extensive a continent, it cannot yet be supposed, but that in such a diversity of climates and situations, a considerable diversity of inhabitants must also be found.

In beginning our inquiries, then, we find in the most northern parts of America, a species of Laplanders, similar to those of Europe, or to the Samoyedes of Asia; and though, in comparison of the latter, they are few in number, yet they are diffused over a considerable extent of ground. Those who inhabit the land of Davis's Strait are of a diminutive size, of an olive complexion, and their legs are short and thick. They are skilful fishers; they eat their fish and their meat raw; their drink consists of pure water, or of the blood of the dog-fish; they are, moreover, very strong, and generally live to a great age. Here we see the figure, the colour, and the manners of the Laplanders; and, what is truly singular is, that, as among the Laplanders of Europe, we meet with the Finlanders, who are white, comely, tall, and tolerably well made; so, in like manner, among the Laplanders of America, we meet with another species of men, tall, well made, tolerably white, and with features exceedingly regular.

Of a different race from the former seem to be the savages of Hudson's Bay, and northward of the land of Labrador: they are, however, ugly, diminutive, and unshapely; their visage is almost entirely covered with hair, like the savages of the country of Yesso, northward of Japan. In summer they dwell under tents made of skins of the rein-deer; in winter they live under ground, like the Laplanders and the Samoyedes, and, like them, sleep together promiscuously, and without the smallest distinction. They likewise live to a great age, though they feed on nothing but raw meat and fish. The savages of Newfoundland have a considerable resemblance to those of Davis's Strait; they are low in stature; they have little or no beard; their visage is broad and flat; their eyes are large; they are generally rather flat-nosed; and, upon the whole, are far from being unlike the savages of the northern continent, and of the environs of Greenland.

Besides these savages, who are scattered over the most northern parts of America, we find others more numerous, and altogether different, in Canada, and in the vast extent of land to the Arctic sea. These are all tolerably tall, robust, vigorous, and well made; they have hair and eyes black, teeth very white, a complexion tawny, their beard scanty, and over the whole of their body hardly a vestige of hair; they are hardy, indefatigable walkers, and very nimble runners. They are alike unaffected by excesses of hunger, and of repletion; they are by nature bold and fierce, grave and sedate. So strongly, indeed, do they resemble the Oriental Tartars in the colour of the skin, the hair, and the eyes, in the scantiness of beard, and of hair, as also in disposition and in manners, that, were they not separated from each other by an immense sea, we should conclude them to be descended from that nation. In point of latitude, their situation is also the same; and this still farther proves how powerfully the climate influences not only the colour, but the figure of men.

Mr. Fabry, who travelled a prodigious way to the north-west of the Mississippi, and visited places which no European had visited before him, and of which, consequently, the savage inhabitants had not been destroyed, asserts, that that part of America is so deserted, that he often travelled a hundred and two hundred leagues, without observing a single human face, or the smallest vestige of a habitation; that, whenever he did meet with any habitations, they were always at immense distances from one another; that, in each of them, there were frequently no more than one family; sometimes there were two or three families, but never above twenty persons together; and that, between these twenty persons and twenty others, there was generally a space of a hundred leagues at least.

To dwell long on the customs of such savage nations, would be unnecessary. It has not been always attended to by authors, that what they have given us for established customs, and for the manners of a community, were nothing more than actions peculiar to a few individuals, and often determined by circumstances or by caprice. Some nations, they tell us, eat their enemies; some burn them, and some mutilate them; one nation is perpetually at war; and of another, the grand object is to live in peace; in one country the child kills his parent, when he has lived to a certain age; and in another the parent eats his child. All these stories, on which travellers have with so much complacency enlarged, mean nothing more than that one savage had devoured his enemy, another had burned or mutilated him, and a third had killed or eaten his child. All these things may be known to happen in one, as well as in several savage nations; for every nation in which there is no government, no law, no master, no habitual society, ought rather to be termed a tumultuous assemblage of men, barbarous and independent; of men who obey nothing but their own private passions, and who, incapable of having a common interest, are also incapable of pursuing one object, and of submitting to fixed and settled usages.

If, however, in the whole of North America, there were none but savages to be met with; in Mexico, and in Peru, there were found nations polished, subjected to laws, governed by kings, industrious, acquainted with the arts, and not destitute of religion.

In the present state of these countries, so intermixed are the inhabitants of Mexico and New Spain, that hardly do we meet with two visages of the same colour. In the town of Mexico, there are white men from Europe, Indians from the north, and from the south of America, and Negroes from Africa, &c. insomuch, that the colour of the people exhibits every different shade which can subsist between black and white. The real natives of the country are of a very brown olive colour, well made, and active; and though they have little hair, even upon their eyebrows, yet upon their head, their hair is long and very black.

In surveying the different appearances which the human form assumes in the different regions of the earth, the most striking circumstance is that of colour. This circumstance has been attributed to various causes; but experience justifies us in affirming, that of this the principal cause is the heat of the climate. When this heat is excessive, as at Senegal and in Guinea, the inhabitants are entirely black; when it is rather less violent, as on the eastern coasts of Africa, they are of a lighter shade; when it begins to be somewhat more temperate, as in Barbary, in India, in Arabia, &c. they are only brown; and, in fine, when it is altogether temperate, as in Europe and in Asia, they are white; and the varieties which are there remarked, proceed solely from those in the mode of living. All the Tartars, for example, are tawny, while the Europeans, who live in the same latitude, are white. Of this difference the reasons seem to be, that the former are always exposed to the air; that they have no towns, no fixed habitations; that they sleep upon the earth, and in every respect live coarsely and savagely. These circumstances alone are sufficient to render them less white than the Europeans, to whom nothing is wanting which may render life comfortable and agreeable. Why are the Chinese whiter than the Tartars, whom they resemble in all their features? It is because they live in towns, because they are civilized, because they are provided with every expedient for defending themselves from the injuries of the weather, to which the Tartars are perpetually exposed.

When cold becomes extreme, however, it produces some effects similar to those of excessive heat. The Samoyedes, the Laplanders, the Greenlanders, are very tawny; and it is even asserted, as we have already observed, that, among the Greenlanders, there are men as black as those of Africa. Here we see two extremes meet: violent cold, and violent heat, produce the same effect upon the skin, because these two causes act by one quality, which they possess in common. Dryness is this quality; and it is a quality of which intense cold is equally productive as intense heat; so by the former, as well as by the latter. the skin may be dried up, altered, and rendered as tawny as we find it among the Laplanders. Cold compresses, shrivels, and reduces within a narrow compass, all the productions of nature; and thus it is, that we find the Laplanders, who are perpetually exposed to all the rigours of the most piercing cold, the most diminutive of the human species.

The most temperate climate is between the degrees of forty and fifty. There we behold the human form in its greatest perfection; and there we ought to form our ideas of the real and natural colour of man. Situated under this zone, the civilized countries are, Georgia, Circassia, the Ukraine, European Turkey, Hungary, South Germany, Italy, Switzerland, France, and the North of Spain; of all which the inhabitants are the most beautiful, and the most shapely, in the world.

As the first, and almost the sole, cause of the colour of mankind, we ought therefore to consider the climate; and though upon the skin the effects of nourishment are trifling, when compared with those of the air and soil, yet upon the form they are prodigious. Food which is gross, unwholesome, or badly prepared, has a strong and a natural tendency to produce a degeneracy in the human species; and in all countries where the people fare wretchedly, they also look wretchedly, and are uglier and more deformed than their neighbours. Even among ourselves, the inhabitants of country places are less handsome than the inhabitants of towns; and I have often remarked, that, in one village, where poverty and distress were less prevalent than in another village of the vicinity, the people of the former were, at the same time, in person more shapely, and in visage less deformed.

The air and the soil have also great influence, not only on the form of men, but on that of animals, and of vegetables. Let us, after examining the peasants who live on hilly grounds, and those who live imbosomed in the neighbouring valleys, compare them together, and we shall find that the former are active, nimble, well shaped, and lively; the women commonly handsome; that, on the contrary, in the latter, in proportion as the air, food, and water are gross, the inhabitants are clumsy, and less active and vigorous.

From every circumstance, therefore, we may obtain a proof, that mankind are not composed of species essentially different from each other; that, on the contrary, there was originally but one individual species of men, which, after being multiplied and diffused over the whole surface of the earth, underwent divers changes, from the influence of the climate, from the difference of food, and of the mode of living, from epidemical distempers, as also from the intermixture, varied *ad infinitum*, of individuals more or less resembling each other; that, at first, these alterations were less considerable, and confined to individuals; that, afterwards, from the continued action of the above causes becoming more general, more sensible, and more fixed, they formed varieties in the species; that these varieties have been, and are still, perpetuated from generation to generation, in the same manner as certain deformities, and certain maladies, pass from parents to their children; and, that, in fine, as they would never have been produced but by a concurrence of external and accidental causes, as they would never have been confirmed and rendered permanent but by time, and by the continued action of these causes, so it is highly probable, that in time they would in the same manner gradually disappear, or even become different from what they at present are, if such causes were no longer to subsist, or if they were in any material point to vary.

Such is Buffon's arrangement of the varieties of the human race. Other naturalists, however, differ widely from him, and the systems which they have formed are numerous. According to Linnæus, Man constitutes the first genus in the class mammalia; thus generically characterised—fore teeth cutting; upper four parallel; teats two, pectoral.

1. Homo sapiens. Diurnal; varying by education and situation. The varieties are as follow—

α. Four-footed, mute, hairy. *Wild man.*

β. Copper-coloured, choleric, erect. *American.* Hair black, straight, thick; nostrils wide; face harsh; beard scanty; obstinate, content, free. Paints himself with fine red lines.

γ. Fair, sanguine, brawny. *European.* Hair yellow, brown, flowing; eyes blue; gentle, acute, inventive. Covered with close vestments. Governed by laws.

δ. Sooty, melancholy, rigid. *Asiatic.* Hair black; eyes dark; severe, haughty, covetous. Covered with loose garments. Governed by opinions.

ε. Black, phlegmatic, relaxed. *African.* Hair black, frizzled; skin silky; nose flat; lips tumid; crafty, indolent, negligent. Anoints himself with grease. Governed by caprice.

2. Homo monstrosus. Varying by climate or art. The varieties of this species are as follow—

α. Small, active, timid. *Mountaineer.*

β. Large, indolent. *Patagonian.*

γ. Less fertile. *Hottentot.*

δ. Beardless. *American.*

ε. Head conic. *Chinese.*

ξ. Head flattened. *Canadian.*

It is evident that this classification is faulty in many respects. That of Gmelin, which is much more simple, makes a nearer approach to correctness. He admits but of one species in the genus, which he arranges under the following varieties:

α. H. albus. *White man.* Formed by the rules of symmetrical elegance and beauty; or at least by what is generally regarded as such. This division includes almost all the inhabitants of Europe; those of Asia, on this side the Obi, the Caspian, Mount Imaus, and the Ganges; as well as the natives of the north of Africa, of Greenland, and the Esquimaux.

β. H. badius. *Brown man.* Of a yellowish brown colour; with scanty hair, flat features, and small eyes. This variety includes the whole of the inhabitants of Asia not comprised in the preceding.

γ. H. niger. *Black man.* Black complexion, frizzly hair, flat nose, and thick lips. The whole of the inhabitants of Africa, excepting those of its more northerly parts.

δ. H. cupreus. *Copper-coloured or red man.* The complexion of the skin resembles the hue of unburnished copper. All the inhabitants of America, except the Greenlanders and Esquimaux.

ε. H. fusus. *Tawney man.* Chiefly of a dark blackish-brown colour; having a broad nose, and harsh, coarse, straight hair. The inhabitants of Australasia, Polynesia, and most of the Indian islands.

Blumenbach, Lacepede, and Cuvier divide man into three principal races; Dumeril makes six; and Bory St. Vincent extends the number to fifteen species, with numerous varieties; "each of which species," he declares with his usual presumptuous flippancy, "we may with a safe conscience believe to have had its peculiar Adam, and its peculiar place of origin." His species are, 1. The *Japetic*, divided into four races, of which the German has two varieties. 2. The *Arabian*. 3. The *Hindoo*. 4. The *Scythian*. 5. The *Sinic* (or Chinese). 6. The *Hyperborean*. 7. The *Neptunian*, containing three races. 8. The *Australian*. 9. The *Columbian*. 10. The *American*. 11.

The *Patagonian.* 12. The *Ethiopian.* 13. The *Caffre.* 14. The *Melanian.* 15. The *Hottentot.* The latter he is pleased to consider as the connecting link between the genus Homo and the genus Oran.

The most recent writer on this subject is M. Lesson. His arrangement is ingenious; and, unlike M. Bory St. Vincent, he does not consider man as only a better sort of monkey. "Man," says he, "differs from all other beings by the eminently social qualities which distinguish him; by the power of thinking, he raises himself to the divinity from whom he emanates; his memory retains facts, and classes and transmits them to others by written signs and speech; he manifests a varied industry, which protects him from all bodies that might be hurtful to him; by means of it he also satifies his wants, and secures his comforts or his pleasures. Man every where lives in families, ruled by chiefs; he establishes laws conformable to his necessities, and designed to protect his rights. He subdues animals, and bends them to obey his will, and breaks up the surface of the earth, and draws his subsistence from it; he has forced vegetables to vary their fruits, and to improve their flavour; by exchanging the produce of his soil, he procures for himself new resources. Wealth heaps its gifts upon him, luxury is introduced, the arts are cultivated, society becomes polished, and manners are softened: happy were he, did not war, and its scourges, and death, and sickness, perpetually remind him that the great work of nature must be accomplished.

"Man is born weak. He remains at the breast from twelve to eighteen months; does not walk alone till nearly his second year; remains a long while feeble; reaches adolescence about the age of sixteen, manhood at thirty, mature age at forty, and old age at sixty, and then rapidly declines towards the close of his existence.

"Man is a cosmopolite; that is to say, his organization is fitted for all climates. He lives under the equator, and in the temperate zones, as well as in the rigorous climes of the north and the south. He does not appear, however, to dwell beyond the fifty-fifth degree of southern latitude and the sixty-fifth of northern.

"He is polyphagous, or accommodates himself to all kinds of nourishment, though he lives chiefly on fruits and farinaceous grain.

"In the human species we may establish three principal races, each of which contains varieties more or less strongly marked. These are, the *White* or *Caucasian;* the *Yellow* or *Mongolian;* and the *Black* or *Melanian.*

"I. WHITE RACE, OR CAUCASIAN.

"This race is characterized by regularity of form, according to the ideas which we have of beauty. The head is oval; the facial angle eighty-five degrees; the skin white, or usually approaching to white; the nose long; the cheeks coloured; the hair long, soft, and of all shades from a light flaxen to the deepest brown. This race derives its name from the circumstance of tradition assigning the Caucasian chain as its original seat.

"BRANCH 1. *Aramean.* It comprehends the Assyrians, Chaldeans, Arabs, Phenicians, Jews, Abyssinians, and, in all probability, the Egyptians.

"BRANCH 2. *Indian, German,* and *Pelasgic.* It comprises the Celts, Cantabrians, Persians, &c.

"BRANCH 3. *Scythian* and *Tartarian.* It is composed of Scythians, Parthians, and Turks; the Finlanders, and the Hungarians also belong to it, with an infinite number of tribes to the north and east of the Caspian.

"VARIETY 1. *Malay* branch. The people who are called Malays have hitherto been united under the name of the Malay race, though they scarcely differ from the Hindoos; they merely form a variety of that people, distinct, and presenting four types, which are, the Malay proper, the Javanese, the Macassar or Budjis, and the Amboynese or Timorian. This variety is confined to the equatorial islands of the Indian Archipelago, or *Malaysia* (as we propose to call it), between Madagascar on the east, the Philippines on the west, the peninsula of Malacca on the north, and the land of Papua, or New Guinea, on the south.

"VARIETY 2. *Oceanic* branch. This variety, which authors class in the *Malay* race, is only a branch of the great Hindoo family, of which it has all the characters. It is disseminated through the islands which are scattered over the immense South Sea, and it, in great part, peoples all the Oceanic lands, from the Sandwich Islands to New Zealand and Easter Island.

"II. YELLOW OR MONGOLIAN RACE.

"This race has a flat face, prominent cheek bones, narrow and oblique eyes, the nose rather flattened, straight black hair, the beard either very thick, or, more frequently, very thin, the complexion commonly olive, and the facial angle from sixty-five to eighty degrees.

"This race forms powerful empires in China and Japan. It inhabits (with the exception of a part of India) all eastern Asia, Lapland, America, and a great number of the South Sea islands.

"BRANCH 1. *Mantchu;* comprehends the people of Bucharia, Daouria, and those who extend from the Caspian to the frontier of Japan.

"BRANCH 2. *Sinic;* forms the immense empire of the centre, or China, so remarkable for its antique stationary civilization; Japan, &c.

"BRANCH 3. *Hyperborean*, or *Esquimaux*. This branch comprises a part of the Laplanders, the Samoyedes, the Labrador Esquimaux, the natives of the north-west coast of America, and those of the Kurile and Aleutian islands. It seems to be imprisoned by ice, and in the most wretched countries of the earth, where it lives in smoky and subterraneous caves during a six months' night.

"BRANCH 4. *American*. This branch, which peoples the American continent, presents numerous varieties. The most remarkable are, the *Peruvian* and *Mexican*, which live under the equator, and founded vast empires; the *Araucanians*, which includes several sub-varieties; the *Patagonians*, confined to the eastern extremity of America, with that of the *Puelces*. Numerous tribes of Brazil, Guiana, the Floridas, and Canada, form also swarms which it is difficult to characterize: the Botocudos of Brazil, however, clearly appear to belong to the Mongol race. Till the present time, the characters assigned to the American or Carib race have been a red skin, as if coppered, dark brown hair, a large beardless face, and a nose rather broad and flat. M. Bory forms them into three species, which he denominates the Columbian, American, and Patagonian.

"The FIFTH BRANCH of this race is that which we have named the *Mongol-pelagian*, or *Caroline*, which peoples the long chain of isles called the archipelago of the Caroline islands, in the great ocean, and which extends from the Philippines to the Mulgrave islands.

"III. BLACK, OR MELANIAN, RACE.

"This epithet is given by M. Bory to a single variety, but we will appropriate it to the whole of the people who are black or blackish, and we prefer it to the name of *Ethiopian*, which carries with it an erroneous idea. This race has the jawbones very prominent in front, teeth inclined, a black or blackish complexion, the hair sometimes glossy, harsh, and rough, but more often woolly and very curled, a short and extremely broad nose, a flat face, thick lips, and the facial angle from seventy to seventy-five degrees.

"This race inhabits all the south of Africa; forms mixtures with the Moors of that part of the world; and lives on the great islands of Madagascar, Papua, the New Hebrides, Solomon's Isles, Van Dieman's Land, and New Holland.

"BRANCH 1. *Ethiopian.* This variety of mankind is the true type of the African Negroes. Its principal characters are, a tolerably deep black colour of the skin, a narrow head, a contracted skull, teeth obliquely set, prominent cheek bones, thick lips, a broad flat nose, little beard, large hips, bowed legs, and the gemini muscles but slightly marked. It inhabits Senegal, Guinea, Congo, &c. &c.

"BRANCH 2. *Caffre.* This branch, which inhabits a part of the southern extremity of Africa, to the eastern coast, appears to extend to Madagascar. It is composed of large, well made men, whose skin is of a grayish black.

"BRANCH 3. *Hottentot.* This branch, the most defective as to form, lives in southern Africa, at the Cape of Good Hope. The facial angle is at most sixty-five degrees; the forehead is prominent, the hair is very short and woolly; the beard is scanty; the tint of the skin is bistre or soot coloured; but that which, according to M. Lichtenstein, more especially distinguishes it is, that, like the monkey, the bones of the nose are united in a single mass, and the olecranian cavity of the shoulder is perforated.

"BRANCH 4. *Papuan;* bears the closest resemblance to the Cafro-Madagascar Negroes, and this analogy is confirmed by several particularities of their constitution and habits. Their skin is of a black colour mixed with an eighth of yellow; their hair is black, very thick, and moderately woolly; the features are tolerably regular; the nose is rather flat and thick, and the nostrils are lengthened transversely. These people inhabit the islands of Papua, New Caledonia, the New Hebrides, New Ireland, Bouka, and the archipelago of Solomon. A hybrid variety, the *Malay-negro*, dwells in the great island of Waigiou and the north of New Guinea.

"BRANCH 5. *Tasmanian;* approximates to the Papuan by its physical conformation. It has also some analogous customs. It inhabits Van Dieman's Land or Tasmania.

"BRANCH 6. *Alfourous-Endamène.* These people, who are as yet but little known, are the *Araforas* or *Alfourous* of voyagers, *los Indios* of the Spaniards, the *Negroes del Monte* of Mindanao, the *Vinzimbers* of Madagascar. They have a blackish skin; straight harsh hair; a large face; the cheek bones projecting; the beard thick and very black; and their manners are brutal. They thrust a bit of wood through the cartilage of the nose.

"BRANCH 7. *Alfourous-Australian.* The people of this branch inhabit the whole continent of New Holland, and are plunged in the grossest barbarism. They have thick, glossy, harsh hair; a thick beard; obliquely-set teeth; a flat large nose; high cheek bones; and the extremities pretty often lank and with little hair."

OF ACCIDENTAL VARIETIES IN THE HUMAN SPECIES. Besides those great varieties proceeding from general causes, which have been just noticed, says Buffon, and which serve as marks of distinction to the nations of the earth, there are others, which affect only individuals, which appear casual and often unfortunate deviations from the general standard. The *Blafards*, or WHITE NEGROES (if this expression may be admitted), are among the first of these extraordinary deviations which attract our attention. They are found occasionally in all parts of the East Indies, at Madagascar, in Africa, at Carthagena, and most parts of South America. They are a weak, imbecile class of human beings, and are in general barren. The Negresses at Carthagena and Panama, more frequently than any others, are known to produce Blafards; and it is to be observed, that the climate there is more debilitating to the human frame. "Those of Darien (says a modern traveller) have so marked a resemblance to the White Negroes of Africa, that we cannot but assign them the same origin. Their colour is dead white, like that of paper or muslin, and without the least appearance of red on any part of the surface of the body. They are born white, and their skin never darkens. In Africa their hair is white and woolly, like that of the genuine Negroes; and in Asia it is long, and as white as snow, or reddish inclining to yellow. Their eyebrows and eyelashes resemble the skin of the eider-duck, or rather the soft down which is about the throat of a swan. The iris is sometimes of a pale blue, and sometimes of a lively yellow inclining to reddish. They are in general remarkably feeble and low of stature." A white Negress, of the name of Genevieve, was born of black parents in the island of Dominica, in the year 1759. Her father and mother were brought from the Gold Coast in Africa, and were perfectly black. Genevieve was white in every part of her body. She was about four feet eleven inches high, and her body was well proportioned. Every feature was completely correspondent to those of the Negroes. The lips and the mouth, however, though perfectly formed like those of other Negroes, had a singular appearance for want of colour; they were as white as the rest of her skin, with no appearance of red. Her skin in general was of a tallow colour; when she approached the fire, however, there was a slight tinge of red appeared in her cheeks. Her head was well covered with wool of about an inch and a half in length. It was harsh, thick, and frizzled; it was white at the roots, and reddish at the extremity. The eyebrows were just marked by a light white down, and the eyelashes were rather more apparent. Her eyes appeared of a dull blue. This white Negress endured the full light of the sun without winking or any apparent inconvenience. She was, what is called, short-sighted; but she could distinguish the smallest objects at two or three inches from her eyes. But the most singular circumstance respecting her eyes, was a continual motion, or oscillation, by which they alternately turned from and towards each other; and this motion she was not ab.c to stop.

Her teeth were well arranged, and finely enamelled; there was no disagreeable smell about her, nor any oiliness upon the skin, as is often the case with common Negroes. Her hands were large but well formed, and were covered with wrinkles, like those of an old person. Her feet and her ancles were also wrinkled. Her parents produced only this girl white; the rest of their children were all perfect Negroes.

It has been said that these White Negroes, if united with Blacks, would produce a pied race; but however this be, it is certain that pied or spotted Negroes are not uncommon. It arises evidently from some defective organization in the skin; and we have instances even in this climate of a similar deviation from the ordinary course of nature.

The Albinoes are, among the Whites, that which the *Blafards*, as Buffon denominates them, are among the

Blacks. This name was originally given by the Portuguese to Moors who were born white, and has since been appropriated to similar individuals in our own race. The best account which has yet appeared of Albinoes is the following, which was sent by Dr. Traill of Liverpool to Nicholson's Journal.

"Robert Edmond and his wife Anne are both natives of Anglesey in North Wales. He has blue eyes, and hair almost black; her eyes are blue, and her hair of a light brown. Neither of them have remarkably fair skins. They have been married fourteen years. Their first child, a girl, had blue eyes and brown hair. The second, a boy (now before me), has the characteristics of an Albino; viz. very fair skin, flaxen hair, and rose coloured eyes. The third and fourth children were twins, and both boys; one of them has blue-eyes and dark brown hair; the other was an Albino. The former is still alive: the Albino lived nine months, though a very puny child. The fifth child, a girl, had blue eyes and brown hair. The sixth, and last now here, is a perfect Albino.

"The oldest of these Albinoes is now nine years of age, of a delicate constitution, slender, but well formed both in person and in features; his appetite has always been bad: he frequently complains of a dull pain in his forehead; his skin is exceedingly fair; his hair flaxen and soft; his cheeks have very little of the rose in them. The iris and pupil of his eyes are of a bright rose-red colour, reflecting in some situations an opaline tinge. He cannot endure the strong light of the sun. When desired to look up, his eyelids are in constant motion, and he is incapable of fixing the eye steadily on any object, as is observed in those labouring under some kind of slight ophthalmia, but in him is unaccompanied by tears. His mother says, that his tears never flow in the coldest weather; but when vexed they are shed abundantly. The white of the eye is generally bloodshot. He says he sees better by candle than by daylight; especially at present, when the reflection from the snow on the ground is extremely offensive to him. He goes to school, but generally retires to the darkest part of it to read his lesson, because this is most agreeable to his eyes. In my room, which has a northern aspect, he can only distinguish some of the letters in the pages of the Edinburgh Review; but, if the light is not permitted to fall full on the book he is able to read most of them. He holds the book very near his eye. His disposition is very gentle; he is not deficient in intellect. His whole appearance is so remarkable, that some years ago a person attempted to steal him, and would have succeeded in dragging him away, had not his cries brought a person to his assistance.

"The youngest child is now nine months old; is a very stout, lively, noisy, and healthy boy. In other respects he perfectly resembles his brother.

"The mother says, that one of her cousins had a very fair skin, flaxen hair, and very weak light blue eyes.

"Professor Blumenbach of Gottingen, in a curious memoir read before the Royal Society of that city, endeavoured to prove, that the red colour of the eyes of the Albinoes of Chamouni was owing to the want of pigmentum nigrum within the eye. About the same time, Buzzi of Milan had an opportunity of dissecting an Albino, and proved, that the pigmentum nigrum of the choroid coat, and also that portion of it which lies behind the iris, and is called uvea by anatomists, were wanting; thus demonstrating what Blumenbach had supposed. This deficiency was observed before by Blumenbach in some white dogs, owls, and in white rabbits. Buzzi discovered, that the layer of the skin called rete mucosum was also wanting, and to this he with great probability attributes the peculiar fairness of the skin; the colouring matter of the Negro, and of the hair of animals, being lodged in this membrane.

"It is well known, that from the tawny natives of Asia, Africa, and America, Albinoes sometimes spring, who are said to be capable of propagating a race like themselves, when they intermarry. Whether this be the case with the Albinoes of Europe is unknown; for as far as I have been able to learn, not one of them was a female.* There are on record eight instances of European Albinoes, besides the three now noticed. Two of these are described by Saussure, four by Buzzi, one by Helvetius, and one by Maupertius, all of whom were males. The parents of the two young men of Chamouni had female children, of the usual appearance. The woman of Milan had seven sons, three of whom were Albinoes. Mrs. Edmond's girls were all of the usual appearance, but all her boys were Albinoes. Among these eleven cases not one Albino girl has been found. This at least proves, that males are more subject than females to this singular structure.

"From the perpetuation of this variety of the human species in Guinea, and other places, as well as from the account Mrs. Edmond gives of her cousin, it would seem to be hereditary."

Among the sports of Nature, with respect to the human race, not one of the least singular was the PORCUPINE MAN. He was born in the county of Suffolk, England, in 1710. The skin of his body was covered with excrescences like thorns, or prickles, and about the thickness of a packthread. His face, the palms of his hands, and the soles of his feet, were the only parts which were free from these singular warts. They were of a reddish brown, and had such a degree of hardness and elasticity, as to rattle when the hand was moved over the body. They were half an inch long in some parts, and were shorter in others. They did not appear till two months after his birth; but what is most extraordinary, they dropped off every winter, and were renewed in the spring. In other respects the man enjoyed a good state of health. He had six children, all of whom, like their father, were covered with these excrescences.

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* Several instances have occurred in England, some of which have been exhibited, under the name of Albinesses.

A child was exhibited in Paris in 1774, whose name was Anna Maria Herig. She was born at Dachstal, in Lorraine, in 1770. Neither her father nor mother had any spots whatever on their skin, but the child was spotted all over the body, and even on the face, with marks, some large and some small, the greater part of which were raised above the skin, like the little blisters or bladders on veal; in some other parts they were covered with hair, like that of a deer. Both the skin and the hair were of a brown colour; there were also spots quite destitute of hair, and the naked skin in those spots resembled tanned leather. In other respects the child was of a pleasant countenance; had handsome eyes, but very large eyebrows. She appeared uneasy in summer from the heat; for besides the hair spots in other parts of her body, her stomach and belly were covered with longish hair, of a brown colour on one side, and lighter on the other; and her back seemed to be covered with a tunick of hairy skin, which adhered to the body only in certain parts, and which in reality consisted of a number of little loops or tubercles very near to each other, and which covered her whole back to her reins; these tubercles appeared of a different nature from the rest of her skin, and were insensible when pinched. The lower part of her loins, and the tops of her shoulders were covered with hair more than two inches in length. Those parts of the skin which were not deformed with these spots, were remarkably white and delicate.

There have been some very extraordinary instances of a change in the colour of Negroes. Frances, the Negro cook of Col. Barnet, was born in Virginia, and was of a very strong and robust constitution. Her skin was originally as black as that of any African Negro; but about the age of fifteen years, she observed that those parts of her skin which were near her nails and her fingers gradually became white. In a short time after, her mouth underwent the same change; and from that period to her fortieth year, the white has been gradually extending over her whole body. Those parts which have changed colour are as delicate as the skin of the most beautiful European, and display very distinctly the ramifications of the red veins. The neck and the back have preserved more of their original colour than any other part; the head, the face, the breast, the belly, the thighs, legs, and arms are become almost entirely white. When the passions of resentment, shame, &c. are excited in this Negress, her face and her breast blush with redness. In the same manner all those parts which are exposed to the fire, become red with the action of heat. She has always enjoyed a remarkably good state of health, has never made use of any application to her skin; she has always been well clothed, and no difference is perceptible between those parts which have been covered and those which have been exposed.

Among these varieties of nature in the human species we may reckon Dwarfs and Giants. Deceived by some optical illusion, the ancient historians gravely mention whole nations of pigmies as existing in remote quarters of the world. The more accurate observations of the moderns, however, convince us that these accounts are entirely fabulous.

The existence, therefore, of a pigmy race of mankind, being founded in error or in fable, we can expect to find men of diminutive stature only by accident, among men of the ordinary size. Of these accidental dwarfs, every country, and almost every village can produce numerous instances. There was a time when these unfavourable children of Nature were the peculiar favourites of the great; and no prince, or nobleman, thought himself completely attended, unless he had a dwarf among the number of his domestics. These poor little men were kept to be laughed at, or to raise the barbarous pleasure of their masters, by their contrasted inferiority. Even in England, as late as the time of King James the First, the court was at one time furnished with a dwarf, a giant, and a jester. These the king often took a pleasure in opposing to each other, and often fomented quarrels among them, in order to be a concealed spectator of their animosity.

It was in the same spirit that Peter of Russia, in the year 1710, celebrated a marriage of dwarfs. This monarch, though raised by his native genius far above a barbarian, was, nevertheless, still many degrees removed from actual refinement. His pleasures, therefore, were of the vulgar kind; and this was among the number. Upon a certain day, which he had ordered to be proclaimed several months before, he invited the whole body of his courtiers, and all the foreign ambassadors, to be present at the marriage of a pigmy man and woman. The preparations for this wedding were not only very grand, but executed in a style of barbarous ridicule. He ordered, that all the dwarf men and women, within two hundred miles, should repair to the capital; and also insisted, that they should be present at the ceremony. For this purpose, he supplied them with proper vehicles; but so contrived it, that one horse was seen carrying a dozen of them into the city at once, while the mob followed shouting and laughing from behind. Some of them were at first unwilling to obey an order, which they knew was calculated to turn them into ridicule, and did not come; but he soon obliged them to obey; and, as a punishment, enjoined that they should wait upon the rest at dinner. The whole company of dwarfs amounted to seventy, beside the bride and bridegroom, who were richly adorned, and in the extremity of the fashion. For this company in miniature, every thing was suitably provided; a low table, small plates, little glasses, and, in short, every thing was so fitted, as if all things had been dwindled to their own standard. It was his great pleasure to see their gravity and their pride; the contention of the women for places, and the men for superiority. This point he attempted to adjust, by ordering that the most diminutive should take the lead; but this bred disputes, for none would then consent to sit foremost. All this, however, being at last settled, dancing followed the dinner, and the ball was opened with a minuet by the bridegroom, who measured exactly three feet two inches high. In the end matters were so contrived, that this little company, who met together in gloomy pride, and unwilling to be pleased, being at last familiarized to laughter, joined in the diversion, and became, as the journalist tells us, extremely sprightly and entertaining.

But the most complete history of a dwarf is preserved by M. Daubenton, in his Natural History. This dwarf, whose name was Baby, was well known, having spent the greatest part of his life at Luneville, in the palace of Stanislaus, the titular king of Poland. He was born in the village of Plaisne, in France, in the year 1741. His father and mother were peasants, both of good constitutions, and inured to a life of husbandry and labour. Baby, when born, weighed but a pound and a quarter. We are not informed of the dimensions of his body at that time, but we may conjecture they were very small, as he was presented on a plate to be baptized, and for a long time lay in a slipper. His mouth, although proportioned to the rest of his body, was not, at that time, large enough to take in the nipple; and he was, therefore, obliged to be suckled by a she-goat that was in the house; and that served as a nurse, attending to his cries with a kind of maternal fondness. He began to articulate some words when eighteen months old; and at two years he was able to walk alone. He was then fitted with shoes that were about an inch and a half long. He was attacked with several acute disorders; but the small-pox was the only one which left any marks behind it. Until he was six years old, he ate no other food but pulse, potatoes, and bacon. His father and mother were, from their poverty, incapable of affording him any better nourishment; and his education was little better than his food, being bred up among the rustics of the place. At six years old he was about fifteen inches high; and his whole body weighed but thirteen pounds. Notwithstanding this, he was well proportioned and handsome; his health was good, but his understanding scarcely passed the bounds of instinct. It was at that time that the king of Poland, having heard of such a curiosity, had him conveyed to Luneville, gave him the name of Baby, and kept him in his palace.

Baby, having thus quitted the hard condition of a peasant, to enjoy all the comforts and the conveniences of life, seemed to receive no alteration from his new way of living, either in mind or person. He preserved the goodness of his constitution till about the age of sixteen, but his body seemed to increase very slowly during the whole time; and his stupidity was such, that all instructions were lost in improving his understanding. He could never be brought to have any sense of religion, nor even to show the least signs of a reasoning faculty. They attempted to teach him dancing and music, but in vain; he never could make any thing of music; and as for dancing, although he beat time with tolerable exactness, yet he could never remember the figure, but while his dancing-master stood by to direct his motions. Notwithstanding, a mind thus destitute of understanding was not without its passions; anger and jealousy harassed it at times; nor was he without desires of another nature.

At the age of sixteen, Baby was twenty-nine inches high; at this he rested; but having thus arrived at his acme, the alterations of puberty, or rather, perhaps, of old age, came fast upon him. From being very beautiful, the poor little creature now became quite deformed; his strength quite forsook him; his back bone began to bend; his head hung forward; his legs grew weak; one of his shoulders turned awry; and his nose grew disproportionably large. With his strength, his natural spirits also forsook him; and, by the time he was twenty, he was grown feeble, decrepid, and marked with the strongest impression of old age. It had been before remarked by some, that he would die of old age before he arrived at thirty; and, in fact, by the time he was twenty-two, he could scarcely walk a hundred paces, being worn with the multiplicity of his years, and bent under the burthen of protracted life. In this year he died; a cold, attended with a slight fever, threw him into a kind of lethargy, which had a few momentary intervals; but he could scarcely be brought to speak. However, it is asserted, that in the last five days of his life, he showed a clearer understanding than in his times of best health: but at length he died, after enduring great agonies, in the twenty-second year of his age.

Baby, it is evident, was a creature calculated rather to excite pity or disgust than any other feeling,—a being as stunted in mind as in body. But to these diminutive beings Nature does not always forget to give intellectual faculties. Jeffery Hudson, to whom Buffon alludes as the dwarf of the English court, was a brave and intelligent man. He killed, in a duel, Mr. Cutts, who had insulted him; and he served as a captain in the royal army. In modern times, we have seen an instance of a dwarf possessed of every mental and personal accomplishment. Count Borulawski was the son of a Polish nobleman attached to the party of King Stanislaus, and who lost his property in consequence of that attachment. His father had six children, three dwarfs, and three of the ordinary stature; and it is a singular circumstance, that they were born alternately, a big and a little one. The count's youngest sister, who died at the age of twenty-three, was of a much more diminutive size than he was. He grew till he was thirty, when he was three feet two inches in height. The proportions of his figure were perfectly correct, which is rarely the case with dwarfs, and his look was manly and noble. His manners were full of grace and politeness; his temper was good; and he possessed a lively wit, united with an excellent memory and a sound judgment. Till the age of forty-one, he lived, in the enjoyment of perfect health, and of all the comforts of life, under the patronage of a lady, who was a friend of the family. He then married a lady, of the middle size, by whom he had three children, none of whom were dwarfs. To procure the means of subsistence for his family, he at first gave concerts in the principal cities of Germany; on which occasions he played upon the guitar, of which instrument he was a perfect master. At Vienna he was persuaded to turn his thoughts to England, where it was supposed that the public curiosity would in a little time benefit him sufficiently to enable him to live independent in a country so cheap as Poland. Borulawski accordingly visited England, where he was admired, and extensively patronized, by the nobility and gentry. He exhibited himself in London, Edinburgh, Dublin, Bath, and most of the principal cities and towns, and wherever he went he gained friends. Borulawski died a few years since. He published his own Memoirs.

Opposite to this accidental diminution of the human race, is that of its extraordinary magnitude. Concerning the reality of a nation of giants, there have been many disputes among the learned. Some have affirmed the probability of such a race; and others as warmly have denied the possibility of their existence. But it is not from any speculative reasonings, upon a subject of this kind, that information is to be obtained.

We have several accounts from mariners, that a nation of giants actually exists; and mere speculation should never induce us to doubt their veracity.

Ferdinand Magellan was the first who discovered this race of people along the coast, towards the extremity of South America. Magellan was a Portuguese of noble extraction, who having long behaved with great bravery, under Albuquerque, the conqueror of India, he was treated with neglect by the court, upon his return. Applying, therefore, to the king of Spain, he was entrusted with the command of five ships, to subdue the Molucca Islands; upon one of which he was slain. It was in his voyage thither, that he happened to winter in St. Julian's Bay, an American harbour, forty-nine degrees south of the line. In this desolate region, where nothing was seen but objects of terror, where neither trees nor verdure dressed the face of the country, they remained for some months without seeing any human creature. They had judged the country to be utterly uninhabitable; when one day they saw approaching, as if he had been dropped from the clouds, a man of enormous stature, dancing and singing, and putting dust upon his head, as they supposed in token of peace. This overture for friendship was, by Magellan's command, quickly answered by the rest of his men; and the giant approaching, testified every mark of astonishment and surprise. He was so tall, that the Spaniards only reached his waist; his face was broad, his colour brown, and painted over with a variety of tints; each cheek had the resemblance of a heart drawn upon it; his hair was approaching to whiteness; he was clothed in skins, and armed with a bow. Being treated with kindness, and dismissed with some trifling presents, he soon returned, with many more of the same stature; two of whom the mariners decoyed on shipboard: nothing could be more gentle than they were in the beginning; they considered the fetters that were preparing for them, as ornaments, and played with them, like children with their toys; but when they found for what purpose they were intended, they instantly exerted their amazing strength, and broke them in pieces with a very easy effort. This account, with a variety of other circumstances, has been confirmed by succeeding travellers: Herrera, Sebald Wert, Oliver Van Noort, and James le Maire, all correspond in affirming the fact, although they differ in many particulars of their respective descriptions. The last voyager we have had, that has seen this enormous race, is Byron.*

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* The soberer narratives of recent travellers have reduced the stature of the Patagonians to a more reasonable standard; though still leaving them the character of being a tall race. From five feet ten to six feet seven inches appears to be the height of the individuals of this tribe.

This race of giants are described as possessed of great strength; and, no doubt, they must be very different from those accidental giants that are to be seen in different parts of Europe. Stature with these, seems rather their infirmity than their pride; and adds to their burthen, without increasing their strength. The generality, indeed, are ill formed and unhealthy; weak in their persons, incapable of exerting what strength they are possessed of. The same defects of understanding that attend those of suppressed stature, are found in those who are thus overgrown; they are heavy, phlegmatic, stupid, and inclined to sadness. The numbers, however, are but few; and it is thus kindly ordered by Providence, that as the middle state is the best fitted for happiness, so the middle ranks of mankind are produced in the greatest numbers.

To these varieties in the human species might be added a considerable catalogue of MONSTERS; but as few of these have survived the hour of their birth, and as the detail of most of them can serve but to disgust, we shall only trouble the reader with a few instances. The first is an affecting account of the most singular production of this kind that stands recorded in the History of Nature.

On the 26th of October, 1701, at Tzoni, in Hungary, two female children were born, which were united together at the loins. They lived to the age of twenty-one years. At seven years of age they were carried into Holland, England, Italy, Russia, and into almost every country of Europe. At the age of nine they were purchased by a pious clergyman, in order to place them in a convent at Petersburgh, where they remained till the 25th of February, 1723, when they died.

One of these twins was named Helen, and the other Judith. Helen appeared first in the birth, as far as the navel, and three hours after she was completely extricated, along with Judith. Helen grew tall, and was straight. Judith was less, and a little crooked. As they were united at the loins, they could only see one another by turning their heads. There was only one anus in common to them both; but in other respects they appeared as two different women. They in general agreed well together, and loved each other affectionately. At six years of age Judith was affected with a palsy on the left side; and though afterwards she appeared cured, she always retained a strong impression of that malady, and her mind was always heavy and weak. Helen, on the contrary, was handsome and gay. She had a good understanding, and some wit. They had the small-pox and the measles at the same time; but they had other maladies or indispositions separately: for Judith was subject to a cough and a fever; Helen on the contrary enjoyed good health. When they were nearly twenty-one years of age, Judith took a fever, fell into a lethargy, and died; the unfortunate Helen was obliged to follow her lot. Three minutes before the death of Judith, she fell into an agony, and died almost at the same moment. In dissecting them, it was found that the entrails of each were perfect, that each had even a distinct canal for the excrements; but which, nevertheless, met and united in the same anus.

Several instances of this phenomenon have occurred, and some of them are of recent date. One of them exists at the present moment. We shall notice but two of the number. The first of them was born at Coimbetore, in the East Indies, in the month of October, 1804. The children were females. In October, 1807, one of them was thirty-four inches high, the other a quarter of an inch shorter. The heads of both were rather long, and the sides of each head much compressed. The features of each strongly resembled the other. The bodies were joined from the lower part of the breast bone to the navel, which was common to both. They were thus face to face, and could sleep in no other position. In walking they moved sideways, and sometimes circularly. They generally slept at the same time, but not always; and one would cry whilst the other did not. If the body of the one was pinched, the other did not appear to feel; but if the connecting part was pinched, both were sensible of pain. Medicine administered to one affected both. Both were healthy children, and not otherwise deformed. One was loquacious, the other talked very little; the liveliest was rather stouter than the other. Both had had the small-pox, at the same time, and favourably. In moving or looking different ways, or rather in directions contrary to their natural position, they crossed their hands and arms. They could walk up stairs, and were active when playing with other children. What became of this curiously joined pair we are not told.

A pair united in a similar manner has recently been exhibited in the United States and England They, too, were born in the east, and are known as the Siamese youths. A fleshy band, of from four to six inches long and two broad, proceeding from the pit of each stomach, connects them together. The entire band admits four fingers to pass freely behind it, when the boys stand shoulder to shoulder, and its width and thickness allow the thumb to meet the fingers on the front aspect. The vestiges of one common navel are visible at the lower and middle part of the band, and it is equidistant between the two bodies. The band is hollow, except about an inch in the centre, and there is evidently a hernial protrusion into it from each of the boys, in the action of coughing. Their appearance is healthy, their dispositions cheerful, and their attitudes and motions graceful. They move across the room with all the ease and grace of a couple skilfully waltzing, and seem never to have any difference of intention or purpose which can give pain to their band of union by making them draw different ways. The natural position of the youths, or that which seems to place the connecting ligament in its natural form, is that of face to face. This position, as must be obvious, is extremely inconvenient, and the boys have consequently accustomed themselves to stand or move side by side. Their persons are thus drawn mutually closer, which makes it necessary for one to place his arm about the neck or waist of the other. The position may be varied—that is, the ligament may be made an axis, upon which the youths can turn and bring in contact the two opposite sides, instead of those which were first in collision. Their identity of purpose, and unity of movement, combined with a general similarity of tastes, dispositions, and habits, had created in some a suspicion that their organization was more intimately connected than at first sight appears. They eat, drink, and sleep simultaneously; their health is affected alike; and, on being conveyed through the streets in a coach, so perfect is their unity of *action*, that they could not be prevailed upon to look out of its opposite windows. These circumstances many have been disposed to attribute to something more than the power of habit; but there can be no doubt that the youths are perfectly distinct beings, having each his organization totally independent of each other. This is placed beyond a doubt by various circumstances. No one can fail to be touched with the perfect harmony that subsists between them. Attempts have been made to create jealousies between them, but without the slightest effect. Any gift which they receive, capable of division, is shared between them; and any other description of present passes from one to the other as a joint possession. It would perhaps be more just to say, that they recognize no difference between themselves. A very attentive observer, however, will not fail to discover between these two boys, who certainly bear the strongest possible resemblance to each other, a marked distinction. One seems to be a little more robust than the other, and even to possess an intellectual superiority over his brother. Perhaps this notion acquires plausibility from the circumstance that the former generally acts as the organ of communication on the joint part with the interpreters. It is observed, that this superior brother yields on all occasions to the impulses of the weaker, giving up his own choice, and preferring the course intimated by the other. The inferior brother then playfully leans against his mate for support, or the one pats the cheek, or presses the forehead, or adjusts the shirt collar of the other, in such a way as betrays the kindliest feelings in each, and the tenderest affection for each other.

A still more wonderful *lusus naturæ* lately existed in the person of a bicephalous girl, born of Sardinian parents. She died recently at Paris. Ritta, or the right side of the infant, had been ill for three days, and her illness did not appear in any degree to influence the health of Christina, the other side; so that at the moment when Ritta had given up the ghost, Christina was hanging to the breast of her mother, and playing with her face. But suddenly she let go, heaved a sigh, and expired. On dissection, two hearts, touching at the upper surface, but perfectly free at the base, were found in one pericardium. There was only one liver, which was evidently formed by the juncture of two; but there were two stomachs, and two small intestines, the latter of which joined ten or twelve inches above the *cæcum*. The *cæcum* was single, and all below was the same. In the pectoral cavity there was only one diaphragm, which had evidently been formed out of those of two subjects.

CHAP. VII.

Of Quadrupeds in general ..Of domestic Animals...The Horse ...The Ass...The Ox...The Sheep...The Goat...The Swine Of the Wild Boar, &c.

IF we descend, by regular gradations, from man to those classes of animals which approach nearest him in their nature and their habits, we must, on every account, assign the first rank to the quadruped part of creation; since whether we direct our attention to their form and structure, or to their manners and instincts, we shall find them more correspondent to our own than those of any other order of animated beings.

The general anatomy of the monkey tribe is so analogous to that of man, that it requires some skill in physiology to make the distinction; and even those quadrupeds which least resemble us, when they erect themselves in an upright position, still preserve striking marks of their affinity.

But, if we compare their internal structure with our own, the likeness will be found still to increase, and we shall perceive many advantages they enjoy in common with us, above the lower tribes of nature. Like us, they are placed above the class of birds, by bringing forth their young alive; like us, they are placed above the class of fishes, by breathing through the lungs; like us, they are placed above the class of insects, by having red blood circulating through their veins; and lastly, like us, they are different from almost all the other classes of animated nature, being either wholly or partly covered with hair. Thus nearly are we represented in point of conformation to the class of animals immediately below us; and this shows what little reason we have to be proud of our persons alone, to the perfection of which quadrupeds make such near approaches.

Even in the passions of man, nay, in the most amiable of the passions, we find some species of this class no contemptible rivals. What can equal the attachment of the dog to its master? Even over the grave that contained his dust has this animal been known to breathe its last. But (without meaning to quote the prodigies and the heroes of this, any more than of any other class) with what fidelity does it accompany, with what constancy does it follow, with what attention does it defend, its master? What eagerness to obtain his caresses! What docility in obeying him! What patience in suffering his bad humours, and his frequently unjust corrections! What mildness and what humility, in its endeavours to be restored to favour! What emotion, what anxiety, what sorrow, when he is absent! What joy when he returns!—From all these circumstances, is it possible not to distinguish friendship? Even among ourselves, is it expressed in characters of superior energy?

The forms and instincts of animals are adapted to their situations. However proud man may superficially suppose the Sloth, that employs whole months in climbing up a tree, or the Mole, whose eyes are too small for distinct vision, to be wretched and helpless creatures, their life is probably a life of luxury to them, and, if abridged in one pleasure, it may be doubled in those that remain.

The heads of quadrupeds are in general calculated for their manner of living. In some it is sharp, in order to enable the animal to turn up the earth in which its food lies. In some it is long, in order to give room for the olfactory nerves, as in dogs, which hunt by the scent

In others it is short, as in the lion, to give it the greater strength, and fit it the better for combat.

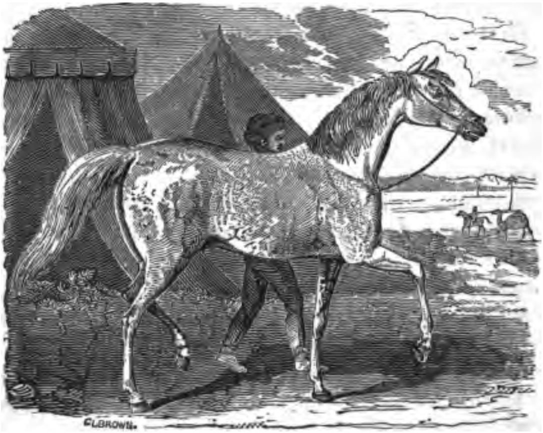
The teeth are also fitted to the nature of their food. In those which live upon flesh, they are sharp, and fitted for holding and dividing; in those which subsist on vegetable diet, they are calculated for pounding or grinding their aliment. Their legs also are equally adapted to the life they are intended to lead. The feet of some that live upon fishing are webbed and calculated for swimming. Animals of prey have their feet armed with claws, which some can sheathe and unsheathe at will.

The stomach is generally proportioned to the quality of the food. In those that live upon flesh, it is small and glandular. On the contrary, animals that live upon vegetables have the stomach very large; and those which chew the cud have no less than four stomachs, though in Africa, where the plants are soft and nutritious, some of this class have only two.

The most obvious distinction in quadrupeds is between those which are domestic, or which man has found easy to reduce to a state of dependence on him, and to retain in it; and the wild, or those which continue in their native savage state.. Many different kinds of classification have been proposed by speculative naturalists; but in an order of beings which contains so small a number of distinct species, scientific arrangements serve rather to confuse than to instruct.

The number of species, in the quadruped class, which may be said to have distinct marks or characters, is usually stated at two hundred; though late authors have enumerated two hundred and eighty, and even some minute philosophers have subdivided them into upwards of four hundred.

THE HORSE.



The noblest conquest which was ever made by man is that of this spirited and haughty animal, which shares with him the fatigues of war and the glory of the combat. Equally intrepid as his master, the Horse sees the danger, and braves it; inspired at the clash of arms, he loves it, he seeks it, and is animated with the same ardour.* He feels pleasure also in the chase, in tournaments, in the course: he is all fire, but, equally tractable as courageous; does not give way to his impetuosity, and knows how to check his inclinations: he not only submits to the arm which guides him, but even seems to consult the desires of his rider;

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* This description from Buffon, is more poetic than correct. The Horse is naturally timid, and dislikes noise and fire. It is by the fear of chastisement, and by the force of habit, that he is brought to face danger. "If Buffon," says Bory St. Vincent, "had ever commanded cavalry in action, he would not have written that the Horse *sees* danger, and *braves* it." ED.

and, always obedient to the impressions which he receives from him, presses on, moves gently, or stops, and only acts as his rider pleases. The Horse is a creature which renounces his being, to exist only by the will of another, which he knows how to anticipate, and even express, and execute by the promptitude and exactness of his movements: he feels as much as we desire, does only what we wish, giving himself up without reserve, and refuses nothing, makes use of all his strength, exerts himself beyond it, and even dies the better to obey us.

Such is the Horse, whose natural qualities art has improved. His education commences with the loss of his liberty, and by constraint it is finished. The slavery or servitude of these creatures is universal, and so ancient that we rarely see them in their natural state: they are never wholly free from all their bands, not even at the time of rest; and if they are sometimes suffered to range at liberty in the fields, they always bear about them tokens of servitude, and frequently the cruel marks of servitude and of pain: the mouth is deformed by the wrinkles occasioned by the bit, the flanks scarred with wounds inflicted by the spur, the hoofs are pierced by nails, the attitude of the body constrained, from the subsisting impression of habitual shackles, from which they would be delivered in vain, as they would not be the more at liberty for it. Even those whose slavery is the most gentle, who are only fed and broken for luxury and magnificence, and whose golden chains serve less to decorate them, than to satisfy the vanity of their master, are still more dishonoured by the elegance of their trappings, by the tresses of their manes, by the gold and silk with which they are covered, than by the iron shoes on their feet.

Nature is more delightful than art; and, in an animated being, the freedom of its movements makes nature beautiful. Observe the Horses in Spanish America, which live wild; their gait, their running, or their leaping, seem neither constrained nor regular. Proud of their independence, they fly the presence of man, and disdain his care; they seek and find for themselves proper nourishment; they wander about in liberty in immense meads, where they feed on the fresh productions of an eternal spring: destitute of any fixed habitation, without any other shelter than a mild sky, they breathe a purer air than those which are confined in vaulted palaces. These wild Horses are also much stronger, much swifter, and more nervous than the greater part of domestic Horses; they have, what nature has bestowed upon them, strength and nobleness; the others only what art can give, beauty and cunning.*

The natural disposition of these animals is not ferocious, they are only high spirited and wild; and though superior in strength to the greatest part of animals, they yet never attack them; and if they are attacked by others, either disdain them or trample them under their feet. They go also in bodies, and unite themselves into troops, merely for the pleasure of being together, for they are not fearful of, but have an attachment to each other. As herbs and vegetables are sufficient for their nourishment, they have quite enough to satisfy their appetite; and as they have no relish for the flesh of animals, they never make war with them, nor with each other; they never quarrel about their food, they have no occasion to ravish the prey of another, the ordinary source of contentions and quarrels among carnivorous animals. They live in peace because their appetite is simple and moderate; and as they have enough, there is no room for envy.

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* Here, again, Buffon is at variance with the fact. "Wild Horses," says a recent writer, "are smaller, weaker, and more timid, than domesticated Horses; their heads are clumsy, large, ignoble, with great ears, which prove their near relationship to the rustic ass; their hair, too, is long, harsh, or frizzled." ED.

As all parts of Europe are at present peopled, and almost equally inhabited, wild Horses are no longer found there; and those which we see in America were originally European tame Horses, which have multiplied in the vast deserts of that country. The astonishment and fear which the inhabitants of Mexico and Peru expressed at the sight of Horses and their riders, convinced the Spaniards that this animal was entirely unknown in these countries; they therefore carried thither a great number, as well for service and their particular utility as to propagate the breed. M. de la Salle, in 1685, saw in the northern parts of America, near the bay of St. Louis, whole troops of these wild Horses feeding in the pastures, which were so fierce that no one dared to approach them. The author of the History of the Adventures of the Buccaneers, says that, in the island of St. Domingo, Horses may sometimes be seen in troops of upwards of five hundred, all running together, and that as soon as they see a man, they will all stop; that one of them will approach to a certain distance, snort, take flight, and then all the rest will follow him. To catch them, they make use of nooses made of ropes, which they spread and hang in places which they know they frequent: but if they are caught by the neck they strangle themselves, unless the hunter comes in time to their assistance, who instantly secures them by the body and legs, and fastens them to trees, where they are left for two days without either food or drink. This experiment is sufficient to begin to make them tractable, and in time they become as much so as if they had never been wild; and even if by chance they ever regain their liberty, they never become so again, but know their masters, and suffer them to catch them again without trouble.

The manners of these animals almost wholly depend on their education. From time immemorial it has been the custom to separate the Colts from their mothers: Mares are suffered to suckle them five, six, or seven months; for experience has taught us, that those Colts which are suckled ten or eleven months, are not of equal value with those which are weaned sooner, though they are generally fuller of flesh. After six or seven months sucking, they are weaned, that they may take more solid nourishment than milk; bran is then given them twice a day, and a little hay, of which the quantity is increased in proportion as they advance in age, and they are kept in the stable as long as they seem to retain any desire to return to the Mare; but when this desire ceases, they are suffered to go out in fine weather, and led to pasture; but care must be taken not to suffer them to go out to pasture fasting; they must have bran, and be made to drink, an hour before they are suffered to graze, and are never to be exposed to great cold or rain: in this manner they spend the first winter; in the May following, they are not only permitted to graze every day, but are suffered to lie in the fields all the summer, and even to the end of October, only observing not to let them eat the after-grass; for if they accustom themselves much to it, they will grow disgusted with hay, which ought, however, to be their principal food during the second winter, together with bran mixed with barley, or oats wetted. They are managed in this manner, till they are four years old, when they are taken from the pastures, and fed on hay. This change in his food requires some precaution; for the first eight days, the Colt should have nothing but straw, and it is proper to administer some vermifuge drinks, as worms may have been generated from indigestion, and green food.

Great attention must be paid in weaning young Colts, to put them into a proper stable, not too hot, for fear of making them too delicate and sensible to the impressions of the air. They should frequently have fresh litter, and be kept very clean, by rubbing them down with a wisp of straw. But they should not be tied up and curried till they are two years and a half or three years old; this currying gives them great pain, their skin being as yet too delicate to bear it, and they would fall away instead of growing fat from it. Care must also be taken that the rack and manger are not too high; the necessity of raising their heads too high, in order to reach their food, may possibly produce a habit of carrying it in this fashion, which would give them an awkward appearance.

At the age of three years, or three years and a half, the rider should begin to break them and make them tractable: they should at first have a light easy saddle, and ought to wear it two or three hours every day; and they should be accustomed to have a snaffle bit in their mouths, and to lift up their feet, on which they should sometimes receive rather smart strokes, and if designed for coach or draught Horses, should wear harness and a bridle. At first a curb should not be used, they should be held by a caveson or leather strap, and be made to trot, on even ground, without a rider, and with only the saddle or harness on the body; and when the saddle Horse turns easily, and willingly follows the person who holds the leather strap, the rough-rider should mount him and dismount again in the same place, without making him move, till he is four years old, because, before that age, the weight of a man overloads him, but at four years he should be made to walk or trot, a little way at a time, with the rider on his back. When a coach Horse is accustomed to the harness, he should be paired with a horse that is thoroughly broken, putting on him a bridle, with a strap passed through it, till he begins to be used to the draught; after this the coachman must teach him to back, having the assistance of a man before, who must push him gently back, and even give him some blows to make him do it: all this should be done before young Horses have changed their food, for when once they are what is called corn-fed, that is, when they feed on grain and hay, as they are more vigorous, it is remarked also that they are less tractable, and more difficult to break.

The bit and the spur are two means made use of to bring them into order. The mouth does not appear formed by nature to receive any other impressions than that of taste and appetite; there is, however, so great a sensibility in the mouth of a Horse, that, in preference to the eyes and ears, we address ourselves to it, to make him understand our pleasure; the smallest motion or pressure of the bit is sufficient to inform and determine the animal; and this organ of sense has no other fault than its perfection. Its too great sensibility must be managed, for if it is abused, the mouth of the Horse is spoiled, and rendered insensible to the impression of the bit; the senses of sight and hearing are not subject to such a change, and could not be dulled in this manner; but it has been found convenient to govern Horses by these organs, and it is generally true, that signs given by the sense of feeling have more effect on animals in general than those conveyed to the eyes or ears; besides, the situation of Horses with relation to those who mount or conduct them, makes their eyes almost useless for this purpose, because they see only straight forwards, so that they could only perceive the signs made to them when they turned their heads round; and although they are frequently conducted and animated by the ear, yet in fact, if they are well broken, the smallest pressure of the thighs, or most trifling motion of the bit, is sufficient to direct them; the spur is even useless, or at least it is only made use of to force them to violent motions; and as, through the folly of the rider, it often happens that in giving the spur he checks the bridle, the Horse, finding himself excited on one side, and kept in on the other, only prances and capers, without stirring out of his place.

By means of the bridle we teach Horses to hold up their heads, and place them in a proper manner, and the smallest sign or movement of the rider is sufficient to make the Horse show all his different paces; the most natural is perhaps the trot, but ambling and galloping are more pleasant for the rider, and these are the two paces we particularly endeavour to improve.

Though walking is the slowest of all their paces, a Horse should, notwithstanding, step quick, and neither take too long nor too short steps: his carriage should be easy: this ease depends much on the liberty of his shoulders, and is known by the manner in which he carries his head in walking; if he keeps it high and steady, he is generally vigorous, quick, and free in his motions. When the motion of the shoulders is not free, the leg does not rise enough, and the Horse is apt to stumble, and strike his foot against the inequalities of the ground; and when the shoulders are still more confined in their action, and the motion of the legs appears free, the Horse is soon fatigued, stumbles, and becomes useless. A Horse should raise his shoulders and his lower haunches in walking; he should also support his leg, and raise it high enough; but if he keeps it up too long, or lets it fall too slowly, he loses all the advantage of his suppleness, becomes heavy, and fit for nothing but to match with another, and for show.

It is not sufficient that his walk should be easy; his steps must be also equal and uniform both behind and before; for if his buttocks have a swinging motion whilst he keeps up his shoulders, the rider is much jolted, which is very uneasy to him: the same thing happens when the Horse extends his hind leg too much, and rests it almost in the same place in which he rested his fore foot. Horses with short bodies are subject to this fault: those which cross their legs or strike them against each other, are not sure-footed; and those whose bodies are long, are the most easy for the rider, because he is at a greater distance from the two centres of motion, the shoulders and haunches, and is therefore less sensible of the motion and jolting.

The usual method of walking among quadrupeds is, to lift up at the same time one of the fore and one of the hind legs; whilst the right fore leg is in motion, the left hind leg follows and advances at the same time, and this step being made, the left fore leg conjointly with the right hind leg in its turn, and so on. As their bodies are supported upon four points, which form a long square, the easiest manner of moving for them, is to change two of them at once in a diagonal line, in such a manner that the centre of gravity of the body of the animal may move but little, and rest always in the direction of the two points which are not in motion; in the three natural paces of the Horse, the walk, the trot, and the gallop, this rule of motion is always observed, but with some difference. In the walk, there are four times in the movement; if the right fore leg moves first, the left hind leg follows the moment after, then the left fore leg moves forward in turn, to be followed the instant after by the right hind leg; thus the right fore foot rests on the ground first, the left hind foot next, then the left fore foot rests, and lastly, the right hind foot, which makes a movement of four times. In the trot there are but two times in the movement; if the right fore leg goes off first, the left hind leg moves at the same time, and without any interval between the motion of the one and the motion of the other; also the left fore leg moves at the same time with the right hind one.

In the gallop there are usually three times; but as in this movement there is a kind of leaping, the interior parts of the horse do not move of themselves, but are driven away by the strength of the haunches and the hinder parts: thus, of the two fore legs, the right ought to advance more forward than the left; the left ought beforehand to rest on the ground, to serve as a point of rest for the sudden jerk which he takes: thus it is the left hind foot that makes the first time of the movement, and which rests on the ground first: then the right hind leg is lifted up conjointly with the left fore leg, and they rest on the ground together: at length, the right fore leg (which is raised an instant after the left fore leg and right hind one) rests on the ground last, which makes the third time: thus, in this movement of the gallop, there are three times and two intervals; and in the first of these intervals, when the movement is made with haste, there is an instant when the fore legs are in the air at the same time, and when the four shoes of the Horse may be seen at once. When the Horse has the haunches and the houghs supple, and moves them with quickness and agility, the movement of the gallop is more perfect, and the cadence is made in four times: he then rests the left hind foot, which shows the first time; then the right hind foot falls to the ground, and shows the second time; the left fore foot falls a moment after, showing the third time; and at length the right fore foot, which rests last, shows the fourth time.

Horses usually gallop on the right foot, in the same manner as they carry the fore right leg in walking and trotting; they also throw up dirt in galloping with the right fore leg, which is more advanced than the left; and also the right hind leg which follows immediately the right fore one, is more advanced than the left hind leg, and that the whole time that the Horse continues to gallop: whence it results, that the left leg which supports all the weight, and which forces forwards the others, is more tired; for this reason it would be right to exercise Horses in galloping alternately on the left foot, as well as on the right; and they would consequently bear much longer this violent motion.

In walking, the legs of the Horse are lifted up only a small height, and the feet almost touch the ground; in trotting, they are raised higher, and the feet are entirely free from the ground; in galloping, the legs are lifted up still higher, and the feet seem to rebound from the earth. The walk to be good should be quick, easy light, and sure; the trot should be firm, quick, and equally sustained; the hind foot ought to follow well the fore foot; the Horse in this pace should carry his head high, and his back straight; for, if the haunches rise and fall alternately at each trot he takes, if the crupper moves up and down, and the Horse rocks himself, he trots ill through weakness; if he throws out wildly his fore legs, it is another fault; the fore legs should tread in a line with the hind ones, which should always efface their tracks. When one of the hind legs is thrown forwards, if the fore leg of the same side remain in its place too long, the motion becomes more uneasy and difficult from this resistance; and it is for this reason that the interval between the two times of the trot should be short; but, be it ever so short, this resistance is sufficient to make this pace more uneasy than walking and galloping, because in walking the motion is more easy, gentle, and the resistance less; and in galloping there is scarcely any horizontal resistance, which is the only one inconvenient for the rider.

Walking, trotting, and galloping, are the most usual natural paces; but some Horses have another natural pace, called the amble, which is very different from the three others, and at the first glance of the eye appears contrary to the laws of mechanics, and extremely fatiguing to the animal, though the quickness of motion is not so great as in galloping, or trotting hard. In this pace the foot of the Horse grazes the ground still more than in walking, and each step is much longer. But the most remarkable circumstance is, that the two legs on the same side set off at the same time to make a step, and afterwards the two other legs move at the same time to make another, so that each side of the body alternately is without support, and there is no equilibrium maintained between the one and the other; it is therefore only from his almost grazing the earth, and the quick alternate motion, that he can support himself in this pace. There is in the amble, as well as the trot, but two times in the motion, and all the difference is, that in the trot the two legs which go together are opposite, in a diagonal line: instead of which, in the amble, the two legs on the same side go together: this pace is very easy for the rider, as it has not the jolting of the trot, which is occasioned from the resistance the fore leg meets with when the hind leg rises; because, in the amble the fore leg rises at the same time with the hind leg on the same side, instead of which, in trotting, the fore leg on the same side rests and assists the impulse during the whole time that the hind leg is in motion.

The Horse, of all animals, is that which, with great stature, has the most complete proportion and elegance in every part of his body; and compared with every other animal he appears superior in these respects. The great length of the jaws is the principal cause of the difference between the heads of quadrupeds and of the human species: it is, also, the most ignoble mark of all: yet, though the jaws of the Horse are very long, he has not, like the ass, an air of imbecility, or of stupidity, like the ox. The regularity of the proportions of his head, on the contrary, gives him an air of sprightliness, which is well supplied by the beauty of his chest. The Horse seems desirous of raising himself above his state of a quadruped, by holding up his head, and in this noble attitude he looks man in the face; his eyes are lively and large, his ears well made, and of a just proportion, without being short like those of the bull, or too long like those of the ass: his mane suits well his head, ornaments his neck, and gives him an air of strength and haughtiness; his long bushy tail covers and terminates advantageously the extremities of his body, far different from the short tails of the stag, the elephant, &c. and the naked tails of the ass, the camel, the rhinoceros, &c. The tail of the Horse is formed of long, thick hair, which seems to come from the rump, because the stump from which it grows is very short; he cannot raise his tail like the lion, but it suits him better hanging down, as he can move it sideways; it is very useful to him to drive away the flies which incommode him: for though his skin is very hard, and is every where furnished with a close thick coat, it is, notwithstanding, extremely sensible.

The head of a well proportioned Horse should be lean and small, without being too long; the ears at a moderate distance, small, straight, immoveable, narrow, thin, and well placed on the top of the head; the forehead narrow, and a little convex; the hollows filled up; the eyelids thin, the eyes clear, lively, full of fire, rather large, and projecting from the head, the pupil large; the nether jaw thin; the nose a little aquiline, the nostrils large and open, the partition of the nose, and the lips, thin; the mouth of a moderate width; the withers raised and sloping; the shoulders thin, flat, and not confined; the back equal, even, and insensibly arched lengthways, and raised on each side of the spine, which should appear indented; the flanks full and short; the rump round and fleshy; the haunches well covered with hair; the stump of the tail thick and firm; the fore legs and thighs thick and fleshy, the knee round before, the houghs large and rounded, the sinew loose, the joint next the foot small, the fetlock not thickly covered with hair, the pastern large, and of a middling length, the coronet rather raised, the hoof black, smooth, shining, and high, the quarters round, the heels wide and moderately raised, the frog small and thin, and the sole thick and hollow.

But there are few Horses in which this assemblage of perfection is to be found; the eyes are subject to many complaints, which are sometimes difficult to be known. In a healthy eye we ought to see through the cornea two or three spots of the colour of soot, above the pupil: to see these spots, the cornea must be clear, clean, and transparent; if it appears double, or of a bad colour, the eye is not good: a small, long, and straight pupil, encompassed with a white circle, is also a bad sign; and when it is of a bluish green colour, the eye is certainly bad, and the sight dull.

It is very easy to judge of the natural and actual state of the animal by the motion of his ears; when he walks, he should project forwards the points of his ears; a jaded Horse carries his ears low; those which are spirited and mischievous, alternately carry one of their ears forwards and one backwards; they all carry their ears on that side from which they hear any noise, and when any one strikes them on the back, or on the rump, they turn their ears back. Horses which have the eyes deep sunk in the head, or one smaller than the other, have usually a bad sight; those which have the mouth dry, are not of so healthy a temperament as those which have the mouth moist, and make the bridle frothy. A saddle Horse ought to have the shoulders flat, moveable, and not very fleshy; the draught Horse, on the contrary, should have them flat, round, and brawny: if, notwithstanding, the shoulders of a saddle Horse are too thin, and the bones show themselves through the skin, it is a defect which shows the shoulders are not free, and consequently the Horse cannot bear fatigue. Another fault of a saddle Horse is, to have the chest project too forward, and the fore legs drawn too much back, because he is apt to rest on the hand in galloping, and even to stumble and fall: the length of the legs should be proportionable to the height of the Horse; when the fore legs are too long, he is not sure footed, if they are too short, he is too heavy in the hand: it is a remark that Mares are more liable than Horses to be short legged, and that Horses in general have the legs thicker than Mares or Geldings.

One of the most important things to be known is, the age of the Horse: it is from the teeth that we obtain the most certain knowledge of their age: the Horse has forty; twenty-four grinders, four eye teeth, and twelve incisive teeth; Mares have no eye teeth, or if they have them they are very short; the grinders are not instrumental to the knowledge of their age; we form our judgment from the front and eye teeth. The twelve front teeth begin to show themselves fifteen days after the birth of the foal; these first teeth are round, short, not strong, and drop out at different times, in order to make room for others: at two years and a half the four front middle teeth drop out the first, two at top, and two at bottom; a year after four others fall out, one on each side of those which are already replaced; at about four years and a half, four others drop out, always on the side of those which have been replaced; these four last milk teeth are replaced by four others, which do not grow near so fast as those which replaced the first eight; and these four last teeth, which are called the wedges, and which replace the four last milk teeth, are those by which we know the age of a Horse; these are easily known, since they are the third as well at top as at bottom, beginning to count from the middle to the extremity of the jaw; these teeth are hollow and have a black mark in their concavity; at four years and a half, or five years old, they scarcely project beyond the gums, and the hollow is plainly seen; at six years and a half it begins to fill up, the mark also begins to diminish and grow narrower, and so continues till seven years and a half or eight years, when the hollow is entirely filled up and the black mark effaced: after the animal has attained eight years, as these teeth do not give further information of the age, we generally judge by the eye teeth or tusks; these four teeth are placed at the side of those which I have just now been speaking of: the eye teeth, as well as the grinders, are not preceded by others which fall out; those of the inferior jaw usually come out first at three years and a half, and the two of the upper jaw at four years, and till they are six years old they are very sharp; at ten years old the upper ones appear already blunt, worn, and long, because they are bare, the gum wearing away with age, and the more they are worn away the more aged the horse is: from ten till thirteen or fourteen years, there is hardly any indication of the age; but then some hairs on the eyebrows begin to grow white; but this indication is equivocal, since it has been remarked that Horses engendered from old stallions and old mares have the hair white on the eyebrows at ten years old. There are also Horses whose teeth are so hard that they do not wear, and upon which the black mark subsists, and is never effaced; and others which have the mark in the mouth as long as they live. We may also know, though with less precision, the age of a Horse by the ridges of the palate, which are effaced in proportion to his age.

It has been remarked, that studs situated in dry and light countries produce good tempered, swift, and vigorous Horses, with nervous legs and hard hoofs; while on the other hand, those which are bred in damp places, and in fat pasturage, have generally the head large and heavy, the legs thick, the hoofs soft, and the feet flat. This difference arises from the climate and food, which may be easily understood; but, what is more difficult to be comprehended, and what is still more essential than any thing that has been said, is, the necessity of always crossing or mixing the breed, if we would prevent their degenerating.

Mares usually go with foal eleven months and some days; they will breed commonly to the age of fourteen or fifteen years, and the more vigorous longer than eighteen years.

The duration of the life of Horses is like that of every other species of animals, in proportion to the time of their growth. Man, who is above fourteen years in growing, lives six or seven times as long, that is to say, ninety or a hundred years. The Horse, who attains his full growth in four years, lives six or seven times as long, that is to say, twenty-five or thirty years. There are so few examples to contradict this rule, that we should not even regard them as exceptions from which we may draw any precedents; and as robust Horses are at their entire growth in less time than delicate ones, they also live less time, and at fifteen years of age are old.

The Arabian Horses are the handsomest known in Europe; they are larger and plumper than those of Barbary, and equally well shaped. The latter are frequently negligent in their paces, and must be often reminded: they are very swift and strong, very light, and very fit for hunting. These Horses seem the most proper to breed from; it is only to be wished that they were of larger stature, as they seldom exceed four feet eight inches high.

The Turkish Horses are not so well proportioned as those of Barbary: they will, however, travel a great way, and are long winded: this is not surprising, if we do but consider, that in warm countries, the bones of animals are harder than in cold climates; and it is for this reason, that they have more strength in the legs.

The Spanish Horses hold the second rank after those of Barbary; those of a handsome breed are plump, well coated, and low of stature; they also use much motion in their carriage, and have great suppleness, spirit, and pride; their hair is usually black, or of a bay chestnut colour, though there are some of all colours; and it is but seldom that they have white legs and noses. The Spaniards, who have an aversion to these marks, never breed from Horses that have them, choosing only a star in the forehead.

The handsomest English Horses have in their conformation great resemblance to those of Arabia and Barbary, from which, in fact, they are bred; they are frequently five feet high, and above; they are of all colours, and have all kinds of marks; they are generally strong, vigorous, bold, capable of great fatigue, and excellent for hunting and coursing.

The Horses of Italy were formerly much handsomer than they are at present, because the breed for some time has been neglected; notwithstanding there are still some handsome Neapolitan Horses, especially draught Horses; but, in general, they have the head large, and the chest thick; they are also untractable. These defects, however, are compensated by their noble form, their stateliness, and the beauty of their motions.

The Danish Horses are so handsome in their form, and so beautiful in their coats, that they are preferred to all others for putting into carriages; they are of all colours, and even of some singular ones, as pied; and Horses spotted like tigers are found no where but in Denmark.

In Germany we meet with very handsome Horses; but they are generally heavy and short breathed. The Hussars and Hungarians split their nostrils, with a view, they say, of giving them more breath, and also to hinder their neighing in battle. The Flemish Horses are greatly inferior to those of Holland: they have almost all large heads, flat feet, and are subject to humours in the eyes; and these two last are essential defects in coach Horses.

According to Marmol, the Arabian Horses are descended from the wild Horses in the deserts of Arabia, of which, in ancient times, large studs were formed, which have multiplied so much, that all Asia and Africa are full of them: they are so swift, that some will outstrip the very ostriches in their course. The Arabians of the desert, and the people of Libya, breed a great number of these Horses for hunting, but neither use them in travelling nor in their wars; they send them to pasture whilst there is grass for them; and when that fails they feed them only with dates and camel's milk, which make them nervous, nimble, and lean. They lay snares for the wild Horses, and eat the flesh of the young ones, which they affirm is very delicate food. These wild Horses are smaller than the tame ones, and are commonly ash-coloured, though there are also some white ones, and the mane and the hair of the tail is short and frizzled.

Let an Arabian be ever so poor, he has Horses. They usually mount the Mares, experience having taught them that they bear fatigue, hunger, and thirst, better than Horses; they are also less vicious. They use them so much to be together, that they will remain so in great numbers for several days, without doing the least harm to each other. The Turks, on the contrary, do not approve of Mares; and the Arabians sell them the Horses which they do not keep for stallions. They have long preserved, with great care, the breed of their Horses; they know their generations, alliances, and all their genealogy, and distinguish the breeds by different names.

As the Arabians have only a tent for their house, this tent serves them also for a stable. The Mare, Colt, husband, wife, and children, lie promiscuously together; and the little children will lie on the body and neck of the Mare and Colt, without these animals incommoding or doing them the least injury. These Mares are so accustomed to live in this familiarity, that they will suffer any kind of play. The Arabians treat them kindly, talk and reason with them, and take great care of them, always let them walk, and never use the spur without necessity; whence, as soon as they feel their flank tickled with the stirrup-iron, they set out immediately with incredible swiftness, and leap hedges and ditches, with as much agility as so many does; and if their rider happens to fall, they are so well broken, that they will stop short, even in the most rapid gallop. All Arabian Horses are of a middling size, very easy in their manner, and rather thin than fat; they are dressed morning and evening regularly, with so much care, that not the smallest spot is left in their skins; their legs are also washed, and their mane and tail are let grow long, and seldom combed, to avoid breaking the hairs. They have nothing given them to eat all day, and seldom are allowed to drink above two or three times; at sunset, a bag is fastened round their heads, in which is about half a bushel of very clean barley. These Horses, therefore, eat only during the night; and the bag is not taken from them till the next morning, when all is eaten up; and in the month of March, when the grass is tolerably high, they are turned out to pasture. As soon as the spring is past, they are taken again from pasture, and have neither grass nor oats all the rest of the year, and straw but seldom, barley being their only food. The mane of the Colts is cut as soon as they are a year or eighteen months old, in order to make it grow thick and long. They mount them at two years old, or two years and a half at farthest; till this age they put neither saddle nor bridle on them; and every day, from morning till night, all the Arabian Horses stand saddled at the door of the tent.

An affecting instance is on record of the attachment which the Arabians feel for their Horses. A poor Arabian of the desert was possessed only of a Mare, which the French consul at Said was desirous to purchase, that he might send her as a present to Louis XIV. The Arab hesitated long, but want drove him to consent, on condition of receiving a large sum, which he himself named. The Arab, clothed in his rags, brought his courser to the consul, dismounted, looked first at the tempting gold, and then steadfastly at his Mare. But here his heart failed him. He heaved a deep sigh, and fondly exclaimed, "To whom am I going to give thee up? To Europeans! who will tie thee close, who will beat thee, who will render thee miserable! Return with me, my beauty! my jewel! and rejoice the hearts of my children." Then, springing on the back of the animal, he was out of sight in a moment.

tiful, the best formed, and most distinguished of animals, if there were no horse in the world: he is the second, instead of being the first; and it is from that only, that he appears to be of no value: the comparison degrades him; we look at him, and give our opinions, not from himself, but comparatively with the horse: we forget that he is an Ass, that he has all the good qualities of his nature, all the gifts attached to his species; and at the same time, we only think of the figure and qualities of the horse, which are wanting in him, and which he ought not to have.

He is naturally as humble, patient, and quiet, as the horse is proud, ardent, and impetuous; he suffers with constancy, and perhaps with courage, chastisement and blows; he is moderate both as to the quantity and quality of his food; he is contented with the hardest and most disagreeable herbs, which the horse, and other animals, will leave with disdain; he is very delicate with respect to his water, for he will drink none but the clearest, and from rivulets which he is acquainted with; he drinks as moderately as he eats, and does not put his nose in the water (through fear, as some say, of the shadow of his ears): as care is not taken to currycomb him, he frequently rolls himself on the grass, thistles, and in the dust; and, without regarding his load, he lays himself down to roll about as often as he can, and by this seems to reproach his master for the little care he takes of him; for he does not paddle about in the mud and in the water; he even fears to wet his feet, and will turn out of his road to avoid the mud; his legs are also drier and cleaner than the horse; he is susceptible of education, and some have been seen sufficiently disciplined to be made a show of.

In their earliest youth, they are sprightly, and even handsome; they are light and genteel; but either from age or bad treatment, they soon lose their beauty, and become slow, indocile, and headstrong. Pliny assures us, that, when they separate the mother from the young one, she will go through fire to recover it. The Ass is also strongly attached to his master, notwithstanding he is usually ill treated; he will smell him afar off, and can distinguish him from all other men;* he also knows the places where he has lived, and the ways which he has frequented: his eyes are good, and his smell acute; his ears are excellent, which has also contributed to his being numbered among timid animals, all of which it is pretended have the hearing extremely delicate, and the ears long. When he is overloaded, he shows it by lowering his head and bending down his ears; when he is greatly abused, he opens his mouth, and draws back his lips in a most disagreeable manner, which gives him an air of derision and scorn; if his eyes are covered over, he remains motionless; and when he is laid down on his side, and his head is fixed in such a manner that one eye rests on the ground, and that the other is covered with a piece of wood or stick, he will remain in this situation without any motion or endeavour to get up: he walks, trots, and gallops like the horse; but been mill-horses, which, at one load, have carried thirteen measures, or nine hundred pounds weight, of corn.

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* A pleasing anecdote illustrative of this is related by Bingley. "An old man, who some years ago sold vegetables in London, used in his employment an Ass to convey his baskets from door to door. Frequently he gave the poor industrious creature a handful of hay, or some pieces of bread, or greens, by way of refreshment and reward. The old man had no need of any goad for the animal, and seldom indeed had he to lift up his hand to drive it on. This kind treatment was one day remarked to him, and he was asked whether his beast was apt to be stubborn. 'Ah, master (he replied), it is of no use to be cruel; and as for stubbornness, I cannot complain, for he is ready to do any thing, or go any where. I bred him myself. He is sometimes skittish and playful, and once run away from me. You will hardly believe it, but there were more than fifty people after him, attempting in vain to stop him; yet he turned back of himself, and never stopt till he ran his head kindly into my bosom.'"

Quadrupeds do not all drink in the same manner, though they are all equally obliged to seek with the head for the liquor, which they cannot get any other way, excepting the monkey, and some others that have hands, and consequently drink like men, when a vase or glass is given them which they can hold; for they carry it to their mouths, inclining the head, throwing down the liquor, and swallowing it by the simple motion of deglutition. Man usually drinks in the same manner, because it is the most convenient. Most quadrupeds also choose that mode which is most agreeable to them, and constantly follow it. The dog, whose mouth is very large, and the tongue long and thin, drinks lapping; that is, by licking the liquor, and forming with the tongue a kind of cup or scoop, which fills each time with a tolerable quantity of liquor; and this mode he prefers to that of wetting the nose. The Horse, on the contrary, whose mouth is small, and whose tongue is too short and thick to scoop it up, and who always drinks with more avidity than he eats, dips the mouth and nose quickly and deeply into the water, which he swallows largely by the simple motion of deglutition; but this forces him to drink without fetching his breath; whilst the dog breathes at his ease while he is drinking. Horses therefore should be suffered to take several draughts, especially after running, when respiration is short and quick. They should not be suffered to drink the water too cold, because that, independently of the colic, which cold water frequently occasions, it sometimes happens also, from the necessity they are in of dipping the nose into the water, that they catch cold, which often lays the foundation of a disorder called the glanders, the most formidable of all to that species of animal; for it is known, that the seat of the glanders is in the pituitary membrane, and that it is consequently a real cold, which causes an inflammation in this membrane; and travellers who give us a detail of the maladies of Horses in warm climates, as in Arabia, Persia, and Barbary, do not say that the glanders are so frequent there as in cold climates. It is from this that the conjecture arises, that this malady is occasioned by the coldness of the water, because these animals are obliged to dip and keep the nose and nostrils a considerable time under water, which would be prevented by never giving it to them cold, and by always wiping the nostrils after they have drunk. Asses, who fear the cold more than Horses, and who resemble them ~~more~~ strongly in the interior structure, are, notwithstanding, not so subject to the glanders; which may possibly happen from their drinking in a different manner from Horses; for, instead of dipping the mouth and nose deeply into the water, they scarcely touch it with their lips.

I shall not speak of the other diseases of Horses; it would extend this Natural History too much to join to the history of an animal that of its disorders; nevertheless, I cannot leave the history of the Horse, without regretting that the health of this useful animal should have been hitherto abandoned to the care, and too frequently absurd practice, of ignorant people. The branch of physic which the ancients called Veterinarian, is at present scarcely known but by name. Were some physician to direct his views this way, and make this study his principal object, he would soon find it to answer his purpose, both with respect to reputation and profit. Instead of degrading himself, he would render his name illustrious; and this branch of physic would not be so conjectural and difficult as the other. All causes being more simple in animals than in man, the diseases ought also to be less complicated, and consequently more easily to be guessed at, and treated with more success, without mentioning the entire liberty he would have of making experiments and finding out new remedies, and the ability of arriving without fear or reproach at a great extent of knowledge of this kind, from which, by analogy, might also be drawn inferences useful to the art of curing mankind. Among the brutal acts which are committed upon Horses, may be reckoned the absurd and inhuman practices of docking and nicking their tails, and applying the shoe red hot to the sole of the foot.

To the preceding account of the Horse, by Buffon, it is proper to add some particulars respecting the wild Horses in our own country. Lewis and Clark in their expedition saw many of them on the plains of the Missouri, and Major Long observed whole troops upon the prairies still farther south.

The Indians are abundantly supplied with Horses, many of which are very fleet and capable of great endurance. A savage warrior mounted on one of these with his long spear, makes a very formidable appearance.

The Indians take no pains to breed Horses, but supply themselves by catching and taming as many as they want. A method sometimes adopted by hunters for taking the wild Horse is to shoot the animal through the neck, using the requisite care not to injure the spine. A Horse may receive a rifle ball through a particular part of the neck, without sustaining any permanent injury; the blow is, however, sufficient to occasion a temporary suspension of the powers of life, during which, the animal is easily taken. This is called *creasing;* and requires, for its successful performance, a very considerable degree of skill and precision in the use of the rifle.

Major Long remarks, that, in the habits of the wild Horse, we find little unlike what is seen in the domestic animal. He becomes the most timorous and watchful of the inhabitants of the wilderness. It would appear, from the paths that are seen, that they sometimes perform long journeys.

THE ASS.

If we consider this animal with some degree of attention, he appears only to be a horse degenerated. The perfect similitude in the conformation of the internal parts, and the great resemblance of the body, legs, feet, and the entire skeleton, is a sufficient foundation for this opinion: we may also attribute the slight differences which are found between these two animals, to the influence of the climate, food, and the fortuitous succession of many generations of small wild horses, half degenerated, which, by little and little, have still continued degenerating, and have at last produced a new and fixed species; or rather a succession of individuals alike, all vitiated in the same manner, sufficiently differing from a horse, to be looked upon as another species. What appears to favour this notion is, that as horses vary much more than Asses in the colour of their skin, they are consequently more anciently domestic, since all domestic animals vary much more in their colour than wild ones of the same species; that the greater number of wild horses, of which travellers speak, are small in their size, and have, like Asses, the coat gray, and the tail naked and frizzled at the end; and, that there are wild horses, and even domestic ones, which have a black stripe on the back, and other marks, which nearly resemble both wild and domestic Asses.

Again, if we consider the difference of the temperament, disposition, and manners; in a word, the organism of these two animals, and above all, the impossibility of mixing the breeds to make one common species, or even an intermediate species which may be renewed; it appears a better founded opinion, that these animals are of a species equally ancient, and originally as essentially different as they are at present; as the Ass differs materially from the horse, in the smallness of the size, largeness of the head, length of the ears, hardness of the skin, nakedness of the tail, the form of the rump, and also in the voice, the appetite, manner of drinking, &c. Do the horse and the Ass, then, come originally from the same stock? are they of the same family, or not? and have they not always been different animals?

Although we cannot demonstrate that the production of a species, by degeneration, is a thing impossible in nature, yet the number of probabilities to the contrary is so great, that even philosophically, we can no longer doubt of it; for if some species have been produced by the degeneration of others, if the species of the Ass comes from the species of the horse, this can only have happened successively; and by degrees there would have been, between the horse and the Ass, a great number of intermediate animals, the first of which would have differed but slightly in its nature from the horse, and the latter would have approached by degrees to that of the Ass; and why do not we see the representatives, the descendants of these intermediate species? why do only the two extremes remain?

The Ass is then an Ass, and not a horse degenerated; the Ass has a naked tail; he is neither a stranger, an intruder, nor a bastard; he has, like all other animals, his family, his species, and his rank; his blood is pure; and although his nobility is less illustrious, yet it is equally good, equally ancient with that of the horse. Why, then, have we so much contempt for this animal—so good, so patient, so steady, so useful? do men carry their contempt even to animals, those which serve them so well, and at so small an expense? We bestow education on the horse, take care of him, instruct him, and exercise him, whilst the Ass is abandoned to the care of the lowest servant, or the tricks of children; so that, instead of improving, he must lose by his education; and if there were not a fund of good qualities, he would certainly lose them by the manner in which he is treated. He is the may-game of the rusticks, who beat him with staffs, overload him, and make him work beyond his strength. We do not consider, that the Ass would be in himself, and with respect to us, the most beautiful, the best formed, and most distinguished of animals, if there were no horse in the world: he is the second, instead of being the first; and it is from that only, that he appears to be of no value: the comparison degrades him; we look at him, and give our opinions, not from himself, but comparatively with the horse: we forget that he is an Ass, that he has all the good qualities of his nature, all the gifts attached to his species; and at the same time, we only think of the figure and qualities of the horse, which are wanting in him, and which he ought not to have.

He is naturally as humble, patient, and quiet, as the horse is proud, ardent, and impetuous; he suffers with constancy, and perhaps with courage, chastisement and blows; he is moderate both as to the quantity and quality of his food; he is contented with the hardest and most disagreeable herbs, which the horse, and other animals, will leave with disdain; he is very delicate with respect to his water, for he will drink none but the clearest, and from rivulets which he is acquainted with; he drinks as moderately as he eats, and does not put his nose in the water (through fear, as some say, of the shadow of his ears): as care is not taken to currycomb him, he frequently rolls himself on the grass, thistles, and in the dust; and, without regarding his load, he lays himself down to roll about as often as he can, and by this seems to reproach his master for the little care he takes of him; for he does not paddle about in the mud and in the water; he even fears to wet his feet, and will turn out of his road to avoid the mud; his legs are also drier and cleaner than the horse; he is susceptible of education, and some have been seen sufficiently disciplined to be made a show of.

In their earliest youth, they are sprightly, and even handsome; they are light and genteel; but either from age or bad treatment, they soon lose their beauty, and become slow, indocile, and headstrong. Pliny assures us, that, when they separate the mother from the young one, she will go through fire to recover it. The Ass is also strongly attached to his master, notwithstanding he is usually ill treated; he will smell him afar off, and can distinguish him from all other men;* he also knows the places where he has lived, and the ways which he has frequented: his eyes are good, and his smell acute; his ears are excellent, which has also contributed to his being numbered among timid animals, all of which it is pretended have the hearing extremely delicate, and the ears long. When he is overloaded, he shows it by lowering his head and bending down his ears; when he is greatly abused, he opens his mouth, and draws back his lips in a most disagreeable manner, which gives him an air of derision and scorn; if his eyes are covered over, he remains motionless; and when he is laid down on his side, and his head is fixed in such a manner that one eye rests on the ground, and that the other is covered with a piece of wood or stick, he will remain in this situation without any motion or endeavour to get up: he walks, trots, and gallops like the horse; but all his motions are smaller, and much slower; notwithstanding he can run with tolerable swiftness, he can gallop but a little way, and only for a small space of time; and whatever pace he uses, if he is hard pressed, he is soon fatigued.

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* A pleasing anecdote illustrative of this is related by Bingley. "An old man, who some years ago sold vegetables in London, used in his employment an Ass to convey his baskets from door to door. Frequently he gave the poor industrious creature a handful of hay, or some pieces of bread, or greens, by way of refreshment and reward. The old man had no need of any goad for the animal, and seldom indeed had he to lift up his hand to drive it on. This kind treatment was one day remarked to him, and he was asked whether his beast was apt to be stubborn. 'Ah, master (he replied), it is of no use to be cruel; and as for stubbornness, I cannot complain, for he is ready to do any thing, or go any where. I bred him myself. He is sometimes skittish and playful, and once run away from me. You will hardly believe it, but there were more than fifty people after him, attempting in vain to stop him; yet he turned back of himself, and never stopt till he ran his head kindly into my bosom.'"

The horse neighs, and the Ass brays, which he does by a long, disagreeable, and discordant cry. The she Ass has the voice clearer and shriller; those that are gelded bray very low; and, though they seem to make the same efforts, and the same motions of the throat, yet their cry cannot be heard far off.

Of all the animals covered with hair, the Ass is least subject to vermin; he has never any lice, which apparently proceeds from the hardness and dryness of the skin, which is certainly harder than in the greatest part of other quadrupeds; and it is for the same reason that he is much less sensible than the horse to the whip, and the sting of the flies.

At two years and a half old, the first middle incisive teeth fall out, and afterwards the other incisive at the side of the first fall also, and are renewed at the same time and in the same order as those of the horse; the age of the Ass is also known by his teeth; the third incisive on each side ascertains it, as in the horse.

The Ass is three or four years in growing, and lives twenty-five or thirty years. They sleep less than the horse, and do not lie down to sleep unless when quite tired.

There are among Asses different races, as among horses; but they are much less known, because they have not been taken the same care of, or followed with the same attention; but we cannot doubt that they came all originally from warm climates. Aristotle assures us, that there were none in his time in Scythia, nor in the other neighbouring countries of Scythia, nor even in Gaul, which, he says, is a cold climate; and he adds, that a cold climate either prevents them from procreating their species, or causes them to degenerate; and that this last circumstance is the reason that they are small and weak in Illyria, Thrace, and Epirus. They appear to have come originally from Arabia, and to have passed from Arabia into Egypt, from Egypt into Greece, from Greece into Italy, from Italy into France, and afterwards into Germany, England, and lastly into Sweden, &c.; for they are, in fact, weak and small in proportion to the coldness of the climate. They are said to have been introduced into England subsequently to the reign of Elizabeth. Of all the various breeds of Asses, the Spanish breed is by far the finest. They are often found of the height of fifteen hands, and the value of a hundred guineas. In the northern parts of the United States, the Ass is little used; in the middle and southern States they are common; in the West Indies, Mexico and South America, they are the chief beasts of burden. In travelling over the Andes they are of the utmost utility.

The Latins, after the Greeks, have called the Wild Ass, Angra; which animal must not be confounded, as some naturalists and many travellers have done, with the zebra; of which we shall give a separate history, because the zebra is of a different species from the Ass.* The Angra, or Wild Ass, is not striped like the zebra, and is not near so elegant in figure. Wild Asses are found in some of the islands of the Archipelago, and particularly in that of Cerigo; there are also many in the deserts of Libya and Numidia; they are gray, and run so fast that the horses of Barbary only can beat them in hunting. When they see a man, they give a loud cry, turn themselves about, and stop, and do not attempt to fly till they find he comes near them: they are taken in snares made with ropes, and go in troops both to pasturage and to drink; their flesh is also eaten. There were also, in the time of Marmol, Wild Asses in the island of Sardinia, but less than those of Africa, and Pietro della Valle says, he has seen a Wild Ass at Bassora, whose figure differed in no respect from a domestic one; he was only of a lighter colour, and had, from the head to the tail, a stripe of white; he was also much livelier, and lighter in hunting, than Asses usually are.

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* We shall also give, in the course of the work, a further account of the Wild Ass, from recent travellers in the interior of Africa.

Neither Asses nor horses were originally found in America, though the climate, and especially of that part called North America, is as good for them as any other: those which the Spaniards have transported from Europe, and which they have left in the West Indies and on the Continent, have greatly multiplied; and in some parts Wild Asses are found in troops, and are taken in snares like wild horses. The Wild Asses of South America will not suffer a horse to live among them. Woe to the horse that chances to stray into the pasture where they are feeding in bands. They fall upon him, and bite and kick him, till he ceases to exist.

The Ass with the mare produces large mules, and the horse with the she Ass produces small mules, differing from the first in many respects. We shall finish the natural history of the Ass with that of its properties, and the uses to which the animal may be applied.

As Wild Asses are unknown in these climates, we cannot in reality say whether the flesh is good to eat; but it is certain that the flesh of the domestic Ass is extremely bad, and harder than that of the horse. The milk of the Ass, on the contrary, is an approved and specific remedy for certain complaints, and its use was known from the Greeks to us: that it may be good in its kind, we should choose a young healthy she Ass, full of flesh, which has lately foaled, and which has not since been with the male: care must be taken to feed her well with hay, wheat, and grass, with particular care not to let the milk cool, and not even to expose it to the air, which will spoil it in a little time.

The skin of the Ass is used for different purposes, such as to make drums, shoes, &c. and thick parchment for pocket books, which is slightly varnished over: it is also of Asses' skin that the orientals make the sagri, which we call shagreen. The roughness of the latter, however, is produced by art.

The Ass is, perhaps, with respect to himself, the animal which can carry the greatest weight; and as it costs but little to feed him, and he scarcely requires any care, he is of great use in the country, at the mill, &c.; he also serves to ride on,* as all his paces are gentle, and he stumbles less than the horse: he is frequently put to the plough, in countries where the earth is light, and his dung is an excellent manure to enrich hard moist lands.

The Ass, like some other animals, and some birds, possesses in great perfection the power of finding his way home, when lost at a great distance. An instance of this is recorded by Kirkby and Spence, in their excellent Introduction to Entomology. In March, 1816, an Ass, the property of Captain Dundas, R. N. then at Malta, was shipped on board the Ister frigate, Captain Forrest, bound from Gibraltar for that island. The vessel having struck on some sands off the Point de Gat, at some distance from the shore, the Ass was thrown overboard, to give it a chance of swimming to land,—a poor one, for the sea was running so high, that a boat which left the ship was lost. A few days afterwards, however, when the gates of Gibraltar were opened in the morning, the Ass presented himself for admittance, and proceeded to the stable of Mr. Weeks, a merchant, which he had formerly occupied, to the no small surprise of this gentleman, who imagined that, from some accident, the animal had never been shipped on board the Ister. On the return of this vessel to repair, the mystery was explained; and it turned out, that Valiante (as the Ass was called), had not only swam safely to shore, but, without guide, compass, or travelling map, had found his way from Point de Gat to Gibraltar,—a distance of more than two hundred miles, through a mountainous and intricate country, intersected by streams, which he had never traversed before, and in so short a period, that he could not have made one false turn. His not having been stopped on the road was attributed to the circumstance of his having formerly been used to whip criminals upon, which was indicated to the peasants, who have a superstitious horror of such Asses, by the holes in his ears, to which the persons flogged were tied.

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* Nothing is more common in Europe than to see men in humble circumstances riding on Asses and Mules. In New England a man would almost as soon be seen mounted on a Cow, as on one of these creatures.

THE MULE

Is an intermediate creature, springing from the union of the male ass with the mare, or of the horse with the female ass, the former being the best); and it accordingly inherits the small legs and handsome shape of the horse, and the long ears, and cross on the back, which characterize its more humble parent. In obstinacy it surpasses the latter; but it is valuable for its sureness of foot, which enables it to pass with safety along the most tremendous precipices, if left to the guidance of its own instinct. The Mule is fond of handsome trappings, and is longer lived than either the horse or the ass. Nature denies it the power of continuing its race. In one or two instances, however, an exception has occurred to this rule.

This animal is much used in the Southern States, in the West Indies, and in South America.

THE OX.

After man, those animals which live on flesh only, are the greatest destroyers: they are at the same time both the enemies of nature and the rivals of man. It is only by an attention always new, and by cares premeditated and followed, that these flocks, these birds, &c. can be sheltered from the fury of the birds of prey, and the carnivorous wolf, fox, weasel, &c. and it is only by a continual war that he can preserve his grain, fruits, all his subsistence, and even his clothing, against the voracity of the rats, moths, mites, &c. Insects are among those creatures which do more harm than good in the world; on the contrary, the Ox, the sheep, and those other animals which feed on grass, are the best, the most useful, and the most valuable for man; since they not only nourish him, but consume and cost him least: the Ox, above all the rest, is the most excellent in this respect, for he gives as much to the earth as he takes from it, and even enriches the ground on which he lives: instead of which, the horse, and the greatest part of other animals, in a few years impoverish the best pasture-land.

That the Ox is not so proper as the horse, the ass, the camel, &c. for carrying burthens, the form of his back and loins demonstrates; but the thickness of his neck, and the broadness of his shoulders sufficiently indicate that he is proper for drawing, and carrying the yoke; it is also in this manner that he draws with the most advantage, and it is singular that this custom is not general.

Throughout some of the French provinces they formerly obliged him to draw with his horns, for which the only reason they gave was, that when harness is fixed to his horns, he is managed with more ease: his head is very strong, and he draws very well in this manner, but with much less advantage than when he draws by the shoulders. He seems to be made on purpose for the plough; the size of his body, the slowness of his motions, the shortness of his legs, and even his tranquillity and patience when he labours, seem to concur in rendering him proper for the cultivation of the fields, and more capable than any other of overcoming the constant resistance that the earth opposes to his efforts.

In those species of animals which man has formed into flocks, and where the multiplication is the principal object, the female is more necessary, more useful than the male.

The produce of the Cow is a benefit which grows, and which is renewed every instant; the flesh of the calf is healthy and delicate; the milk is the food of children; butter relishes the greatest part of our victuals, and cheese is the common food of the country people. How many poor families are, in some countries, reduced to live on their Cow.

At eighteen months old, the Cow is arrived at puberty, and the Bull when he arrives at two years; but though they can continue their species at this age, it is better to stay till they are three years old before they are suffered to procreate: the strength of these animals is greatest from three years old till nine; after this, neither Cows nor Bulls are fit for any thing but to fatten for the slaughter: as at two years of age they are almost at their full growth, the length of their lives is about fourteen years, and they seldom live longer than fifteen.

In stature the **Bull** equals the horse, but he is much stronger made in all parts of his body, particularly about the neck and head; his horns are thick and large, and when enraged, he gores and tosses both man and beast. This

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white: at sixteen months those on each
teeth drop out, and are replaced by oth-
years old, all the incisive teeth are re-
then all long, white, and even; and, in
Ox advances in years, they decay, and
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Bull; the growth of these second horns is not uniform. The first year, that is to say, the fourth year of the age of the Ox, two little pointed horns sprout, which are even, and terminate at the head by a kind of knob; the following year this knob grows from the head, pushed out by a cylinder of horn, which forms and terminates also by another knob, and so on; for as long as the animal lives, the horns grow: these knobs become annular knots, which are easily to be distinguished in the horns, and by which also the age may be easily known, by reckoning three years for the first knob next the point of the horn, and one year more for each of the intervals between the other knobs.

The breeds of Oxen, especially in England, where much pains have been taken to improve them, are numerous. One of the largest kinds is the KYLOE OX. It is a Scotch breed of cattle, chiefly of a black colour, with thick hides, much hair, and frequently large and long horns. They fatten well, and frequently attain to a great size. Mr. Culley mentions one which weighed one thousand four hundred and ten pounds and a half. The name of Kyloe is said to be derived from their having crossed the kyles, or ferries, with which the Highlands of Scotland abound.

The horse eats night and day, slowly, but almost continually; the Ox, on the contrary, eats quick, and takes in a short time all the food which he requires; after which he ceases eating, and lies down to ruminate. This difference arises from the different conformation of the stomachs of these animals. The Ox, of whose stomachs the two first form but one bag of a vast capacity, can in both of them, without inconvenience, at the same time receive grass, which it afterwards ruminates and digests at leisure. The horse, whose stomach is small, and can receive but a small quantity of grass, is filled successively, in proportion as he digests it, and it passes into the intestines, where is performed the principal decomposition of the food.

Chewing the cud is but a vomiting without straining, occasioned by the reaction of the first stomach on the food which it contains. The Ox fills the two first stomachs, the paunch, and the bag, which is but a portion of the paunch, as much as he can. This membrane acts with force on the grass which it contains; it is chewed but a little, and its quantity is greatly increased by fermentation. Were the food liquid, this force of contraction would occasion it to pass by the third stomach, which only communicates with the other by a narrow conveyance, and cannot admit such dry food, or, at least, can only admit the moister parts. The food must, therefore, necessarily pass up again into the œsophagus, the orifice of which is larger than the orifice of the conduit, and the animal again chews and macerates it, and moistens it afresh with his saliva; he reduces it to a paste, liquid enough for it to go into this conduit, *which* passes into the third stomach, where it is again macerated before it goes into the fourth; and it is in the last stomach that the decomposition of the hay is finished, which is reduced to a perfect mucilage.

What chiefly confirms the truth of this explication is, that as long as the animals suck, and are fed with milk and other liquid aliments, they do not chew the cud; and that they chew the cud much more in winter, when they are fed with dry food, than in summer, when they eat tender grass.

Good milk is neither too thick nor too thin; its consistence should be such, that when we take a drop, it should preserve its roundness without running, and in colour it should be of a beautiful white: that which is inclinable to blue or yellow is not good; its taste should be sweet, without any bitterness or sourness: it is best during the month of May, and during the summer; and milk is never perfectly good but when the cow is of a proper age, and in good health. The milk of young heifers is too thick, that of old cows during the winter is also too thick. The milk of cows which are hot is not good, any more than that of a cow which is near her time, or which has lately calved. In the third and fourth stomach of the calf which sucks, there are clots of curdled milk; these clots of milk dried in the air serve to make rennet, and the longer it is kept the better it is, and it requires but a small quantity to make a large quantity of cheese.

Bulls, cows, and oxen, are very apt to lick themselves, but mostly when they are quiet and at rest; and, as it is thought that it prevents their fattening, it is usual to rub all the parts of their bodies which they can touch with their dung. When this precaution is not taken, they raise up the hair of their coats with their tongues, which are very rough, and they swallow this hair in great quantities. As this substance cannot digest, it remains in the stomach, and forms round, smooth balls, which are sometimes of so considerable a size, that they incommode them, and prevent their digestion, by remaining in the stomach. These knobs in time get covered with a brown crust, which is somewhat hard; it is, notwithstanding, only a thick mucilage, which, by rubbing and coaction, becomes hard and shining; it is never found any where but in the paunch, and if any of the hair gets into the other stomachs, it does not remain any more than in the bowels, but seems to pass with the aliment.

Animals which have incisive teeth, such as the horse and the ass, in both jaws, bite short grass more easily than those which want incisive teeth in the superior jaw; and if the sheep and the goat bite the closest, it is because they are small, and their lips are thin. But the Ox, whose lips are thick, can only bite long grass; and it is for this reason digests it, and it passes into the intestines, where is performed the principal decomposition of the food.

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THE SHEEP.

We can no longer doubt, that animals which are actually domestic, were formerly wild: those whose history has already been given, afford a sufficient proof of it; and there are still wild horses, wild asses, and wild bulls. But man, who has conquered so many millions of individuals, can he boast of having conquered an entire species? As they were all created without his participation, may he not also believe that they all have had orders to grow without his help? If we consider, nevertheless, the weakness and stupidity of the Sheep, and at the same time reflect that this animal, without defence, cannot find safety in flight;

that he has for his enemies all devouring animals, which seem to seek him in preference to any other, and to devour him by choice; that formerly this species produced but few; that each individual lived but a short time; we shall be tempted to think that, from the beginning, Sheep were confided to the care of man; that they had occasion for his protection to subsist, and of his care to multiply; since it is a fact, that there are no wild Sheep in the deserts;* that in all places where man does not rule, the lion, the tiger, and the wolf reign by force and by cruelty; that these animals of blood and carnage all live long, and multiply much more than Sheep: and in short, that if we were now to abandon the flocks which we have rendered so numerous, they would soon be destroyed before our eyes, and the species would be entirely annihilated by the voraciousness of its numberless enemies.

The Sheep is indeed absolutely without resource and without defence. The Ram has but feeble arms; his courage is nothing but a petulance useless to himself, inconvenient to others, and which is destroyed by castration.†

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* We shall hereafter have occasion to notice the Rocky Mountain Sheep, which are known to abound in the western regions of our country. By this it will be seen, that this animal can multiply without the care and protection of man.

† Buffon does injustice to the Sheep. It is only in his thoroughly domesticated state that the Sheep is cowardly. In mountainous countries, where he ranges over a wide extent, and with little control, he is deficient neither in courage nor intelligence. A Ram or a Wedder will attack, and often defeat, a single dog. He will even engage a bull; and as the bone of his forehead is much harder than that of any other animal, he is generally victorious in this apparently unequal contest. The bull, according to his custom, lowers his head, and is brought to the ground by the stroke of the Ram between his eyes. When individual strength is not sufficient to afford protection, Sheep will combine against dogs and other enemies.

Ram Goat female

The Wether Sheep are still more timorous than Ewes; it is through fear that they gather so often in troops; the smallest noise, to which they are unaccustomed, is sufficient to make them fly, and get close together. This fear is attended with the greatest stupidity; for they know not how to fly the danger, nor do they even seem to feel the inconvenience of their situation; they continue wherever they are, either in rain or snow; and to oblige them to change their situation, they must have a chief, who is intrusted to walk first, and whom they will follow step by step. This chief will remain with the rest of the flock, without motion, in the same place, if he be not driven from it by the shepherd, or the dog which guards them, who, in fact, watches for their safety, defends, directs, and separates them, assembles them together, and communicates to them motions not their own. Goats, which in many things resemble Sheep, have much more understanding.

But this animal, so cowardly in itself, so wanting in sentiment and interior qualities, is to man the most valuable of all animals, and the most useful, both for his present and future support. Of itself it supplies our greatest necessities. It furnishes us both with food and clothing. Without reckoning the particular advantages we have from the milk, the skin, and even the bowels, the bones and the dung of this animal seem to evince that nature has given it nothing but what turns out useful to man.

These animals, whose understanding is so simple, are also of a very weak constitution, for they cannot walk long; travelling weakens and exhausts them; and when they run, they pant and are soon out of breath. The great heat of the sun is as disagreeable to them as too much moisture, cold, or snow. They are subject to many disorders, the greatest part of which are contagious; superabundance of fat sometimes kills them, and always prevents them from having young ones. They suffer a great deal in having young, have frequent abortions, and require more care than any other domestic animal.

At one year old, Sheep lose the two front teeth of the inferior jaw; and almost every one knows that they have no incisive teeth in the superior jaw; at eighteen months old, the two neighbouring teeth of the two first that fell, fall also; and, at three years old, they are all replaced; they are then even, and tolerably white; but, in proportion as the animal becomes older, they become uneven and black. The age of the Ram is also known by his horns, which show themselves in the first year, and frequently from the birth; they grow every year a ring, which is a mark round, and continue growing till death. Most commonly, the Sheep have no horns; but they have bony prominences on their heads, in the same part where the horns of the Rams grow; there are, notwithstanding, some Sheep which have two, and even four horns. These Sheep are like the others; their horns are five or six inches long, but less turned than those of the Ram; and when there are four horns, the two exterior ones are shorter than the two others.

Sheep carry their young five months, and drop them at the beginning of the sixth; they usually produce but one Lamb, and sometimes two; in warm climates they may produce twice a year, but in cold climates they produce but once a year.

The Sheep has great plenty of milk for five or six months. This milk is tolerable food for children, and for poor people in the country; and they make good cheese with it, especially when it is mixed with cow's milk.

In dry soils, and in high grounds, where wild thyme and animal is very short lived for his size and strength, seldom exceeding sixteen years.

The dullest and most idle animals are not those which sleep the soundest or the longest. The Ox sleeps, but his sleep is short, and not very sound; for he awakes at the least noise: he usually lies on his left side, and that kidney is always larger and fatter than the kidney on the right side.

Oxen, like other domestic animals, differ in colour; but red appears the most common, and the redder they are, the more they are esteemed. It is said, that Oxen of a bay colour last longest; that those of a brown colour are sooner fatigued and shorter lived; that the gray, brindled, and white are not proper for work, and only fit to be fatted for slaughter; but whatever colour the coat of the Ox is of, it should be shining, thick, and soft to the touch; for if it is rough and uneven, we have reason to think that the animal is not well, or, at least, that he is not of a strong constitution.

The Ox should only be worked from three years old to ten; and it is proper to take him then from the plough, in order to fatten and sell him, as the flesh will be better than if he be kept longer. The age of this animal is known by his teeth and horns. The first front teeth fall out when he is ten months old, and are replaced by others which are larger and not so white: at sixteen months those on each side of the middle teeth drop out, and are replaced by others; and at three years old, all the incisive teeth are renewed: they are then all long, white, and even; and, in proportion as the Ox advances in years, they decay, and become unequal and black. The horns fall off at three years, and these are replaced by other horns, which, like the second teeth, fall off no more; only those of the Ox and the Cow grow larger and longer than those of the

Bull; the growth of these second horns is not uniform. The first year, that is to say, the fourth year of the age of the Ox, two little pointed horns sprout, which are even, and terminate at the head by a kind of knob; the following year this knob grows from the head, pushed out by a cylinder of horn, which forms and terminates also by another knob, and so on; for as long as the animal lives, the horns grow: these knobs become annular knots, which are easily to be distinguished in the horns, and by which also the age may be easily known, by reckoning three years for the first knob next the point of the horn, and one year more for each of the intervals between the other knobs.

The breeds of Oxen, especially in England, where much pains have been taken to improve them, are numerous. One of the largest kinds is the KYLOE OX. It is a Scotch breed of cattle, chiefly of a black colour, with thick hides, much hair, and frequently large and long horns. They fatten well, and frequently attain to a great size. Mr. Culley mentions one which weighed one thousand four hundred and ten pounds and a half. The name of Kyloe is said to be derived from their having crossed the kyles, or ferries, with which the Highlands of Scotland abound.

The horse eats night and day, slowly, but almost continually; the Ox, on the contrary, eats quick, and takes in a short time all the food which he requires; after which he ceases eating, and lies down to ruminate. This difference arises from the different conformation of the stomachs of these animals. The Ox, of whose stomachs the two first form but one bag of a vast capacity, can in both of them, without inconvenience, at the same time receive grass, which it afterwards ruminates and digests at leisure. The horse, whose stomach is small, and can receive but a small quantity of grass, is filled successively, in proportion as he

THE GOAT.

THE species of animals are all separated by such a narrow interval, that there seems between them only the necessary space to draw a line of separation. The ass might almost replace the horse; and if the species of sheep were to fail, that of the Goat might supply the loss. The Goat, like the sheep, furnishes milk, and even in greater abundance; she also has suet in abundance; her hair, though rougher than wool, serves, however, to make very good stuffs; and her skin is worth more than the skin of the sheep. The flesh of the young Goat also nearly resembles that of the lamb. These auxiliary species are wilder and more robust than the principal species. The ass and the Goat do not require so much care as the horse and the sheep; for they every where find food to support them, and browse equally on plants of all kinds, even coarse herbs, and bushes with thorns on them. They are less affected with the intemperance of the climate; they can do better without the help of man; and the less dependence they have on us, the more they seem to belong to nature.

Although the Goat is a distinct species, and perhaps more distant from that of the sheep than the species of the ass is from that of the horse, yet the Goat will willingly couple with the sheep, as the ass with the mare, and are sometimes prolific; but they have never introduced any intermediate species between the Goat and the sheep. These two species are distinct, remaining constantly separated, and always at the same distance from each other, and have never been changed by this mixture, or produced any new stock, or new breed of intermediate animals; for they have, at most, only produced different individuals, which has no influence on the unity of each primitive species, and which, on the contrary, confirms the reality of their different characteristics.

The Goat has naturally more understanding, and can shift better for herself than the sheep; she comes voluntarily, and is easily familiarized; she is sensible of caresses, and capable of attachment; she is also stronger, lighter, more agile, and less timid than the sheep; she is lively, capricious, and lascivious.

Goats are fond of straying in solitary places, are fond of climbing up steep places, sleeping on the tops of rocks, and on the brink of precipices. They leap with ease and security among the most dreadful precipices; and even when two of them are linked together, they will leap in such perfect concert as to reach in safety the desired spot.

The inconstancy of this animal's nature is shown by the irregularity of her actions: she walks, stops short, runs, jumps, advances, retreats, shows, then hides herself, or flies; and this all from caprice, or without any other determinate cause than her whimsical vivacity: and all the suppleness of the organs, all the nerves of the body, are scarcely sufficient for the petulance and rapidity of these motions, which are all natural to her.

That these animals are naturally fond of mankind, and that in uninhabited places they do not become wild, the following anecdote serves to confirm.* In 1698, an English vessel having put into harbour at the island of Bonavista, two negroes presented themselves on board, and offered the English as many Goats as they chose to carry away. On the captain manifesting a degree of surprise at this offer, the negroes observed there were but twelve persons in all the island; that the Goats multiplied so fast, that they became troublesome; and that, far from having any difficulty in taking them, they followed them with a kind of obstinacy, like domestic animals.

Goats go five months with young, and bring forth at the beginning of the sixth month; they suckle the young ones for about a month or five weeks; so that it may be reckoned about six-and-twenty weeks from the time of their coupling till the time that the young Kid begins to eat. The Goat generally produces one Kid, sometimes two, very rarely three, and never more than four; and she brings forth young, from a year or eighteen months, to seven years. The knobs in the horns, and their teeth, ascertain their age. The number of teeth is not always the same in female Goats; but they have usually fewer than the male Goat, which has also the hair rougher, and the beard and the horns longer. These animals, like oxen and sheep, have four stomachs, and chew the cud. This species is more diffused than the sheep; and Goats, like ours, are found in several parts of the world: only in Guinea and other warm countries they are smaller, but in Muscovy and other cold climates they are larger. The Goats of Angora and of Syria have ears hanging down, but are of the same species with ours; they mix and produce together, even in our climate; the males have horns almost as long as the common Goat, but the circumference and directions are very different; they are extended horizontally on each side of the head, and form spirals, somewhat like a worm. The horns of the female are short, and first turn round backwards, then bend down, and turn round before, so much, that they end near the eyes; and in some their circumference and direction vary. The male and female Goat of Angora, which I have seen, are such as I have described; and these Goats, like all the animals of Syria, have the hair very long and thick, and so fine that stuffs have been made of it, almost as handsome and glossy as our silks. It is, in fact, what is commonly termed *mohair.*

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* We shall hereafter give an account of the Rocky Mountain goat, which appears to be very wild, and flies with great timidity from man.

THE SWINE.

I SHALL treat of the Swine, the Hog of Siam, and the wild Boar, at the same time, because they form all three but one and the same species; one is wild, the other two are domestic.

Aristotle first divided quadrupeds into beasts with the hoof entire, those with cloven feet, and the species which have claws; and he allows that the Hog is of an ambiguous nature; but the only reason he gives is, that in Illyria, Swine are found which have hoofs, and in some other parts a species which have claws. This animal is also a kind of exception to the two general rules of nature, viz. that the larger animals are, the fewer young they produce at a birth; and that of all animals, those which have claws are the most prolific. The Hog, though in its make greatly above the middling size, produces more than any such animal, or, indeed, than any other quadruped.

A striking instance of the prolific nature of the Sow is given by the Rev. G. White, in his Natural History of Selborne. " The natural term of a Hog's life (says he) is little known, and the reason is plain—because it is neither profitable nor convenient to keep that turbulent animal to the full extent of its time; however, my neighbour, a man of substance, who had no occasion to study every little advantage to a nicety, kept a half-breed Bantam Sow, who was as thick as she was long, and whose belly swept upon the ground, till she was advanced to her seventeenth year; at which period she showed some tokens of age, by the decay of her teeth and the decline of her fertility. For about ten years this prolific mother produced two litters in the year, of about ten at a time, and once above twenty at a litter; but as there were near double the number of Pigs to that of teats, many died. From long experience in the world, this female was grown very artful. When she found occasion to converse with a Boar, she used to open all the intervening gates, march, by herself, up to a distant farm, where one was kept; and, when her purpose was served, would return by the same means. At the age of about fifteen, her litters began to be reduced to four or five; and such a litter she exhibited when in her fatting pen. She proved, when fat, good bacon, juicy, and tender; the rind,

or sward, was remarkably thin. At a moderate computation, she was allowed to have been the fruitful parent of three hundred Pigs; a prodigious instance of fecundity in so large a quadruped."

To the singularities we have already related, we shall add another, which is, that the fat of the Hog is different from that of almost all other quadruped animals, not only in its consistence and quality, but also in its position in the body of the animal. The fat of man, and of animals which have no tallow, such as the dog, the horse, &c. is mixed pretty equally with the flesh; the suet in the ram, the goat, &c. is found only in the extremities of the flesh; but the fat of the Hog is neither mixed with the flesh, nor collected at the extremities of it; it covers it all over, and forms a thick, distinct, and continued bed or layer, between the flesh and the skin. The Hog has this in common with the whale, and other cetaceous animals, the fat of which is only a kind of lard, nearly of the same consistence, but more oily than that of the Hog. This lard in cetaceous animals also forms beneath the skin a bed of many inches in thickness, which envelopes the flesh.

There are only the Hog, and two or three other species of animals, which have defensive or canine teeth very long: they differ from the other teeth, by coming out at the front, and growing during their whole lives. In the elephant and sea-cow they are cylindrical, and some feet in length; in the wild Boar and male Hog, they are partly bent in form of a circle; and I have seen them from nine to ten inches in length. They are not very deep in the socket, and have also, like those of the elephant, a cavity at the superior extremity; but the elephant and sea-cow have only these defensive teeth in the superior jaw, and even want canine teeth in the inferior jaw; instead of which, the male Hog and wild Boar, have them in both jaws, and those of the inferior are the most useful to the animal; these are also the most dangerous; for it is with these lower tusks the wild Boar wounds.

Of all quadrupeds, the Hog appears the most rough and unpolished. His voraciousness apparently depends on the continual necessity which he has to fill the vast capaciousness of his stomach. It is the roughness of the hair, the hardness of the skin, and the thickness of the fat, which render these animals so insensible to blows. Mice have been known to lodge in their backs, and eat their fat and their skin, without their seeming sensible of it. Their other senses are good; and the huntsmen know that wild Boars both see, hear, and smell, at a great distance; since, in order to surprise them, they wait in silence during the night, and place themselves under the wind, to prevent the Boars perceiving their smell, of which they are sensible at a great distance, and which always immediately makes them change their road.

Their imperfection in the sense of touch is still more augmented by a distemper which is called the measles, and which renders them almost absolutely insensible. This disorder proceeds in general from the coarseness of their food; for the wild Boar, which usually lives on corn, fruits, acorns, and roots, is not subject to this distemper, any more than the young Pig whilst it sucks. This is only to be prevented by keeping the domestic Hog in a clean stable, and giving him plenty of wholesome food: by this means his flesh will become excellent to the taste, and the lard firm and brittle, if, as I have seen practised, he is kept for a fortnight or three weeks before he is killed, in a clean stable, without litter, giving him no other food than dry corn: for this purpose we should choose a Swine of about a year old, full of flesh and fat.

Voracious and uncleanly as he is, the Hog has some good qualities. If one of his own kind utters a cry of distress, every Hog within hearing instantly hurries to his assistance. When teased by a dog, they have been known to hem him round, and kill him. If a male and female are brought up together when young, and the latter loses her companion, she begins immediately to decline, and probably dies of a broken heart.

Nor is the Hog wholly useless while living. In Minorca, he is frequently yoked to the plough in conjunction with an ass, and he performs his task in a workmanlike manner. In some parts of Italy and France, Swine are used to discover truffles, which grow a few inches under the surface of the soil. A cord is tied round the animal's hind leg, he is conveyed to the field, and wherever he stops to root with his nose, there the truffle is invariably found. A recent French writer on the noble science of gastronomy ludicrously denominates the Hog "the Christopher Columbus of the truffle."

That Hogs are not destitute of sagacity is proved by the long succession of learned Pigs which, for so many years, have been trained to astonish the multitude at fairs, and other places where numbers of persons are congregated. Of their sense and tractability, Bingley gives a curious instance of another kind. "This," says he, "was afforded by Toomer, the gamekeeper of the late Sir H. P. St. John Mildmay, actually breaking in a New Forest Sow to find game, back and stand, nearly as well as a pointer. This Sow, when very young, took a great partiality to some pointer puppies that Toomer, then under keeper of Broomy Lodge, in the New Forest, was breaking. It played and often came to feed with them. From this circumstance, it occurred to Toomer, to use his own expression, 'that, having broken many a dog as obstinate as a Pig, he would try if he could also suceed in breaking a Pig.' The little animal would often go out with the puppies for some distance from home; and Toomer would entice it further by a sort of pudding made of barley meal, which he carried in one of his pockets. The other he filled with stones, which he threw at the Pig whenever she misbehaved, as he was not able to catch and correct her in the same manner as he did his dogs. He informed Sir Henry Mildmay that he found the animal very tractable, and that he soon taught her what he wished by this mode of reward and punishment. Sir Henry Mildmay informed me that he had frequently seen her out with Toomer, when she quartered her ground, stood when she came on game, having an excellent nose, and backed other dogs as well as he ever saw a pointer. When she came on the cold scent of game, she slackened her trot, and gradually dropped her ears and tail till she was certain, and she then fell down on her knees. So stanch was this animal, that she would frequently remain five minutes and upwards on her point. As soon as the game rose, she always returned to Toomer, grunting very loudly for her reward of pudding, if it was not immediately given to her. When Toomer died, his widow sent the Pig to Sir Henry Mildmay, who kept it for three years, but never used it, except for the purpose of amusing his friends. In doing this, a fowl was put into a cabbage net, and hidden among the fern in some part of the Park, and the extraordinary animal never failed to point it, in the manner above described. Sir Henry was, at length, obliged to part with this Sow, from a circumstance as singular as the other occurrences of her life. A great number of lambs had been lost, nearly as soon as they were dropped; and a person having been sent to watch the flock, the animal was detected in the very act of devouring a lamb. This carnivorous propensity was ascribed to her having been accustomed to feed with the dogs, and to partake of the flesh on which they were fed. Sir Henry sent her back to Mrs. Toomer, who sold her to Mr. Sykes, of Brookwood, in the New Forest, where she died the usual death of a Pig, and was converted into bacon."

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The HOG OF SIAM resembles the wild Boar more than the common Hog. One of the most evident signs of degeneration is the ears, which become much more supple when the animal changes into the domestic state: in short, those of the domestic Hog are not near so stiff, are much longer, and more pendent than those of the wild Boar, which should be looked on as the model of the species.

CHAP. VIII.

On another Class of domestic Animals.....The Dog.....Its Varieties....Of the Cat, &c.

THE DOG.

The largeness of the make, the elegance of the form, the strength of the body, the freedom of the motions, and all the exterior qualities, are not the noblest properties in an animated being; and, as in mankind, understanding is preferred to figure, courage to strength, and sentiment to beauty; so the interior qualities are those which we esteem most in animals; for it is in these that they differ from the automaton; it is by these they are raised above the vegetable, and made to approach nearer to ourselves; it is their sense which ennobles their being, which regulates, which enlivens it, which commands the organs, makes the members active, gives birth to desire, and gives to matter progressive motion, will, and life.

The Dog, independently of his beauty, vivacity, strength, and swiftness, has all the interior qualities which can attract the regard of man. The tame Dog comes to lay at his master's feet his courage, strength, and talents, and waits his orders to use them; he consults, interrogates, and beseeches; the glance of his eye is sufficient; he understands the signs of his will. Without the vices of man, he has all the ardour of sentiment; and what is more, he has fidelity and constancy in his affections; no ambition, no interest, no desire of revenge, no fear but that of displeasing him; he is all zeal, all warmth, and all obedience; more sensible to the remembrance of benefits than of wrongs, he soon forgets, or only remembers them to make his attachment the stronger; far from irritating, or running away, he even exposes himself to new proofs; he licks the hand which is the cause of his pain, he only opposes it by his cries, and at length entirely disarms it by his patience and submission.

More docile and flexible than any other animal, the Dog is not only instructed in a short time, but he even conforms himself to the motions, manners, and habits of those who command him; he has all the manners of the house where he inhabits; like the other domestics, he is disdainful with the great, and rustic in the country, always attentive to his master; and striving to anticipate the wants of his friends, he gives no attention to indifferent persons, and declares war against those whose station makes them importunate; he knows them by their dress, their voice, their gestures, and prevents their approach. When the care of the house is intrusted to him during the night, he becomes more fiery and sometimes ferocious; he watches, he walks his rounds, he scents strangers afar off; and, if they happen to stop, or attempt to break in, he flies to oppose them, and, by reiterated barkings, efforts, and cries of passion, he gives the alarm. As furious against men of prey as against devouring animals, he flies upon, wounds, and tears them, and takes from them what they were endeavouring to steal; but, content with having conquered, he rests himself on the spoils, will not touch it even to satisfy his appetite, and at once gives an example of courage, temperance, and fidelity.

Thus we may see of what importance this species is in the order of nature. By supposing for a moment that they had never existed; without the assistance of the Dog, how could man have been able to tame, and reduce into slavery, other animals? How could he have discovered, hunted, and destroyed wild and obnoxious animals? To keep himself in safety, and to render himself master of the living universe, it was necessary to begin by making himself friends among animals, in order to oppose them to others. The first art, then, of mankind, was the education of Dogs, and the fruit of this art was the conquest and peaceable possession of the earth.

The Dog, faithful to man, will always preserve a portion of empire, and a degree of superiority over other animals; he commands them, and reigns himself at the head of a flock, where he makes himself better understood than the voice of the shepherd: safety, order, and discipline are the fruits of his vigilance and activity; they are a people who are submissive to him, whom he conducts and protects, and against whom he never employs force, unless it be to maintain peace. But it is above all in war against those animals which are his enemies, or which are independent, that his courage shines forth, that his understanding is displayed, and that his natural and acquired talents are united. As soon as the sound of the horn, or the voice of the huntsman, has given the signal of an approaching war, filled with a new ardour, the Dog expresses his joy by the most lively transports, and shows by his motions, and cries of impatience, his desire to combat and to conquer; then, walking in silence, he searches to know the place where his enemy is, to discover and surprise him; he seeks out his traces, he follows them step by step, and, by different cries, indicates the time, the distance, the species, and even the age of what he is in pursuit of.

In deserts, and depopulated countries, there are wild Dogs, which in their manners differ only from wolves, by the facility with which they are tamed; they unite also in large troops, to hunt and attack by force wild boars and bulls, and even lions and tigers. In America, the wild Dogs spring from a breed anciently domestic, having been transported from Europe; and having been either for-is little known, and the reason is plain—because it is neither profitable nor convenient to keep that turbulent animal to the full extent of its time; however, my neighbour, a man of substance, who had no occasion to study every little advantage to a nicety, kept a half-breed Bantam Sow, who was as thick as she was long, and whose belly swept upon the ground, till she was advanced to her seventeenth year; at which period she showed some tokens of age, by the decay of her teeth and the decline of her fertility. For about ten years this prolific mother produced two litters in the year, of about ten at a time, and once above twenty at a litter; but as there were near double the number of Pigs to that of teats, many died. From long experience in the world, this female was grown very artful. When she found occasion to converse with a Boar, she used to open all the intervening gates, march, by herself, up to a distant farm, where one was kept; and, when her purpose was served, would return by the same means. At the age of about fifteen, her litters began to be reduced to four or five; and such a litter she exhibited when in her fatting pen. She proved, when fat, good bacon, juicy, and tender; the rind,

or sward, was remarkably thin. At a moderate computation, she was allowed to have been the fruitful parent of three hundred Pigs; a prodigious instance of fecundity in so large a quadruped."

To the singularities we have already related, we shall add another, which is, that the fat of the Hog is different from that of almost all other quadruped animals, not only in its consistence and quality, but also in its position in the body of the animal. The fat of man, and of animals which have no tallow, such as the dog, the horse, &c. is mixed pretty equally with the flesh; the suet in the ram, the goat, &c. is found only in the extremities of the flesh; but the fat of the Hog is neither mixed with the flesh, nor collected at the extremities of it; it covers it all over, and forms a thick, distinct, and continued bed or layer, between the flesh and the skin. The Hog has this in common with the whale, and other cetaceous animals, the fat of which is only a kind of lard, nearly of the same consistence, but more oily than that of the Hog. This lard in cetaceous animals also forms beneath the skin a bed of many inches in thickness, which envelopes the flesh.

There are only the Hog, and two or three other species of animals, which have defensive or canine teeth very long: they differ from the other teeth, by coming out at the front, and growing during their whole lives. In the elephant and sea-cow they are cylindrical, and some feet in length; in the wild Boar and male Hog, they are partly bent in form of a circle; and I have seen them from nine to ten inches in length. They are not very deep in the socket, and have also, like those of the elephant, a cavity at the superior extremity; but the elephant and sea-cow have only these defensive teeth in the superior jaw, and even want canine teeth in the inferior jaw; instead of which, the male Hog and wild Boar, have them in both jaws, and those of the inferior are the most useful to the animal; these are also the most dangerous; for it is with these lower tusks the wild Boar wounds.

Of all quadrupeds, the Hog appears the most rough and unpolished. His voraciousness apparently depends on the continual necessity which he has to fill the vast capaciousness of his stomach. It is the roughness of the hair, the hardness of the skin, and the thickness of the fat, which render these animals so insensible to blows. Mice have been known to lodge in their backs, and eat their fat and their skin, without their seeming sensible of it. Their other senses are good; and the huntsmen know that wild Boars both see, hear, and smell, at a great distance; since, in order to surprise them, they wait in silence during the night, and place themselves under the wind, to prevent the Boars perceiving their smell, of which they are sensible at a great distance, and which always immediately makes them change their road.

Their imperfection in the sense of touch is still more augmented by a distemper which is called the measles, and which renders them almost absolutely insensible. This disorder proceeds in general from the coarseness of their food; for the wild Boar, which usually lives on corn, fruits, acorns, and roots, is not subject to this distemper, any more than the young Pig whilst it sucks. This is only to be prevented by keeping the domestic Hog in a clean stable, and giving him plenty of wholesome food: by this means his flesh will become excellent to the taste, and the lard firm and brittle, if, as I have seen practised, he is kept for a fortnight or three weeks before he is killed, in a clean stable, without litter, giving him no other food than dry corn: for this purpose we should choose a Swine of about a year old, full of flesh and fat.

Voracious and uncleanly as he is, the Hog has some good qualities. If one of his own kind utters a cry of distress, every Hog within hearing instantly hurries to his assistance. When teased by a dog, they have been known to hem him round, and kill him. If a male and female are brought up together when young, and the latter loses her companion, she begins immediately to decline, and probably dies of a broken heart.

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CHAP. VIII.

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In deserts, and depopulated countries, there are wild Dogs, which in their manners differ only from wolves, by the facility with which they are tamed; they unite also in large troops, to hunt and attack by force wild boars and bulls, and even lions and tigers. In America, the wild Dogs spring from a breed anciently domestic, having been transported from Europe; and having been either forgotten or abandoned in these deserts, they are multiplied to such a degree, that they go in troops to inhabited places, where they attack the cattle, and will sometimes even insult the inhabitants. They are then obliged to drive them away by force, and to kill them like other ferocious animals; and, in fact, Dogs are such, till they become acquainted with man: but when we approach them with gentleness, they grow tame, soon become familiar, and remain faithfully attached to their masters; instead of which, the wolf, although taken young, and brought up in the house, is only gentle in his youth, never loses his desire for prey, and, sooner or later, gives himself up to his fondness for rapine and destruction.

The Dog may be said to be the only animal whose fidelity may be put to the proof; the only one which always knows his master and his friends; the only one which, as soon as an unknown person arrives, perceives it; the only one which understands his own name, and which knows the domestic call; the only one which has not confidence in himself alone; the only one which, when he has lost his master, and cannot find him, calls him by his lamentations; the only one which in a long journey, a journey that, perhaps, he has been but once, will remember the way, and find the road; the only one, in fine, whose talents are evident, and whose education is always good.

Of all animals, moreover, the Dog is most susceptible of impressions, and most easily taught by moral causes; he is also, above all other creatures, most subject to the variety and other alterations caused by physical influence. The temperament, the faculties, and habits of the body vary prodigiously, and the shape is not uniform: in the same country, one Dog is very different from another Dog, and the species is quite different in itself in different climates.

But what is most difficult to ascertain in the numerous variety of different races, is the character of the primitive and original breed. How are we to know the effects produced by the influence of the climate, food, &c.?

As amongst domestic animals, the Dog is, above all others, that which is most attached to man; that which, living like man, lives also the most irregularly; that in which sentiment predominates enough to render him docile, obedient, and susceptible of all impressions, and even of all constraint; it is not astonishing, that of all animals this should also be that in which we find the greatest variety, not only in figure, in height, and in colour, but in every other quality.

There are also some circumstances, which still concur to this change: the Dog in general lives but a short time; he produces frequently, and in pretty large numbers; and as he is perpetually beneath the eyes of man, as soon as by a chance usual to nature, there may have been found among some individuals, singularities, or apparent varieties, endeavours may have been used in order to perpetuate them, by uniting together these singular individuals, as we do at present, when we want to procure new breeds of Dogs, and other animals.

Dogs which have been abandoned in the deserts of America, and have lived wild for a hundred and fifty, or two hundred years, though changed from their original breed, since they are sprung from domestic Dogs, have, notwithstanding this long space of time, retained, at least, in part, their primitive form, and travellers report that they resemble our greyhound.* These wild Dogs, however, are extremely thin and light; and as the greyhound does not differ much from the cur, or from the Dog which we will call the shepherd's Dog, it is natural to think, that these wild Dogs are rather of this species, than real greyhounds; since on the other side, ancient travellers have said, that the Dogs of Canada had the ears straight like foxes, and resembled the middle sized mastiff, that is, our shepherd's Dog, and that those of the deserts of the Antilles isles, had also the head and ears very long, and in appearance very much resemble foxes.

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* It must not be understood that the Dog is not an original inhabitant of America. Godman remarks that the people of the northern parts of America and Asia, have, for ages beyond the memory of man, employed Dogs as beasts of burden, or for draught. The Dogs of the Esquimaux and other aboriginals of this continent differ much in size and colour, yet they are all of a breed apparently intermediate to the wolf and fox.

Besides this, in searching with a view to find what travellers have said of the forms of Dogs of different countries, we find, that Dogs of cold climates have all long snouts and straight ears; that those of Lapland are small, that their ears are straight, and their snouts pointed; that those of Siberia, known by the name of wolf-dogs, are larger than those of Lapland; but that they have also the ears straight, the hair rough, and the snout pointed; that those of Iceland have also some resemblance to those of Siberia; and that, even in warm climates, such as the Cape of Good Hope, the Dogs natural to the countries have sharp snouts, straight ears, the tail dragging on the ground, and the hair shining, but long and frizzled.

We may presume, then, with some appearance of truth, that the shepherd's Dog is, of all Dogs, that which approaches nearest to the primitive races of this species; since, in all countries inhabited by savages, or, at least, by men half civilized, the Dogs resemble this breed more than any other; since, on the whole continent of the new world, they had no other; since they are to be found only in the north and south of the eastern continent; and since, in France and England, where this species is usually called the shepherd's Dog, and in other temperate climates, it is still more numerous; though we are much more occupied in giving birth to, or in multiplying, the breeds which are more pleasing, than preserving those which are more useful, and which we have disdained and abandoned to the peasants who have the care of our flocks.

The Dog, when he is born, is not entirely finished. In this species, as in those of all animals which produce in great numbers, the young ones, at the time of their birth, are not so perfect as those of animals which only produce one or two. Dogs are commonly born with their eyes shut: the two eyelids are not only closed, but adhere by a membrane, which breaks away as soon as the muscle of the superior eyelid is become strong enough to raise itself, and to overcome this obstacle; and the greater number of Dogs have not their eyes open till the tenth or twelfth day. At this time, the bones of the skull are not finished, the body is puffed out, the snout is swelled, and they have not their proper form; but in less than a month they learn to make use of all their senses, and begin to have strength and a swift growth. In the fourth month, they lose some of their teeth; and these, as in other animals, are soon replaced by others, which do not fall out again: they have in all forty-two teeth.

Bitches go with young nine weeks, that is, sixty-three days, but never less than sixty. Length of life in dogs is like that of other animals, proportioned to the time required for their growth; for if they are about two years in growing, so they live also twice seven years.

In the Memoirs of the Academy of Sciences, we find the history of a Bitch, which having been accidentally left behind in a country-house, subsisted forty days without any other food than the stuff or the wool of a mattrass that she had torn. Water seems to be still more necessary for dogs than food; they drink frequently and abundantly; and it is even a vulgar opinion, that if they want water for any length of time, they become mad.

To give a clearer idea of the order of Dogs, of their generation in different climates, and of the mixture of their breeds, I here join a table, or rather a kind of genealogical tree, in which, with a glance of the eye, all the different varieties of the species may be seen.

The *Shepherd's Dog* is the stock or body of the tree. This Dog, transported into the rigorous climate of the North, as into Lapland, for example, has become ugly and small; he seems, however, to have been kept up, and even brought to perfection, in Iceland, Russia, and Siberia, where the climate is rather less rigorous, and where the people are more civilized. These changes have been occasioned by the influence of climate alone, which has produced no great alteration in the form; for all these Dogs have straight ears, long and thick hair, and a wild look.

The same shepherd's Dogs, transported into temperate climates, and among people who are quite civilized, such as those of England, France, or Germany, lose their savage air, their straight ears, their long, thick, and rough hair, and become *mastiff*, *hound*, or *bulldog*, by the influence of climate merely. Of the mastiff, and the bulldog, the ears are still partly straight, or only half pendent; and in their manners and sanguinary disposition they resemble the Dog from which they drew their origin. The hound is the most distant of the three: the long pendent ears, the docility, gentleness, and, we may say, timidity of this Dog, are so many proofs of the great degeneration, or, better, perhaps, to express it, the great perfection, which a long state of subjection has produced, joined to a careful and well followed education.

The *hound*, the *setting-dog*, and the *terrier*, are only one and the same race of Dogs; for it has been remarked, that the same birth has produced setting-dogs, terriers, and hounds, though the hound bitch has only been covered by one of the three Dogs.

The *beagle*, and almost all sorts of Dogs transported into Spain and Barbary, have the hair fine, long, and thick, and become *spaniels* and *barbets*. The great and little spaniel, which differ only in size, when transported into England, change their colour from black to white, and, by the influence of the climate, are become large, small, and shaggy: to these we may also join the terrier, which is but a black beagle, like the others, but with liver-coloured marks on the fore feet, the eye, and the snout.

The shepherd's Dog, transported to the north, is become a *large Dane*, and into the south, is become a *greyhound.* The large greyhounds come from the Levant; those of a middling size from Italy: and greyhounds from the latter of these places, when transported into England, become smaller greyhounds.

The large Danes, transported into Ireland, the Ukraine, Tartary, Epirus, and Albania, are become large *Irish Dogs*, and in size surpass all the rest of the species.

The bulldog transported from England into Denmark, is become a *small Dane;* and this small Dane, when transported into warm climates, loses its hair entirely, and becomes the naked *Turk Dog*. All these races, with their varieties, have been produced solely by the influence of climate, joined to the effect of their food, and of a careful education; the other Dogs are not of a pure race, and come from a mixture of these first races.

The greyhound, and the shepherd's Dog, have produced the *mongrel greyhound*, which is called the greyhound with wolf's clothing. Of this mongrel the snout is not so slender as that of the Turkish greyhound, which is very rare in France.

The large Dane, and the large spaniel, have produced together the *Dog of Calabria*, which is a handsome Dog with long, thick hair, and which is taller than the larger mastiff.

The spaniel and the terrier produce another kind of Dog, which is called the *Burgundy spaniel.* The spaniel and the little Dane produce the *liondog*, which is very scarce.

The Dogs with long, fine, and curled hair, which are called *Dogs of Burgos*, and which are of the size of the largest barbets, come from the large spaniel and the barbet.

The *little barbet* comes from the small spaniel and the barbet.

The bulldog produces, with the mastiff, a mongrel, which is called the *strong bulldog*, and is much larger than the real bulldog, and approaches the bulldog more than the mastiff.

The *pug* comes from the English bulldog, and the little Dane.

All these races are simple mongrels, and come from the mixture of two pure races; but there are also other Dogs which may be called double mongrels, because they come from the mixture of a pure race, and of one already mixed.

The *shockdog* is a double mongrel, which comes from the pug and the small Dane.

The *Dog of Alicant* is also a double mongrel, which comes from the pug and the little spaniel.

The *Maltese*, or lapdog, is a double mongrel, and comes from the small spaniel and the barbet.*

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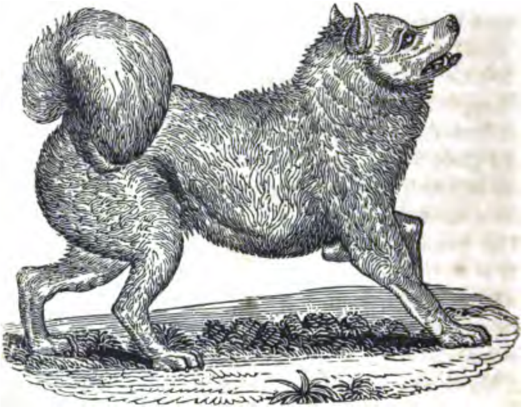
* This theory of Buffon, respecting the original stock whence all the varieties of Dogs are derived, is now generally abandoned, as untenable. A recent writer (Mr. Wilson) endeavours to trace to the wolf and jackal the origin of all our domestic breeds of Dogs.

In addition to what Buffon has said with respect to Dogs in general, it will be proper to lay before the reader a brief account of some of the numerous species of these useful and affectionate animals. The first which we shall introduce to notice has few claims to our kindness. Unlike his congeners, he has no love for man, and seems to possess no attractive qualities.

THE HYÆNA DOG.

THIS Dog is a native of Southern Africa, and is a serious nuisance to the frontier settlements at the Cape. It hunts in packs, generally at night, and is exceedingly fierce, swift, and active. Sheep, it unhesitatingly attacks, but it is less daring with respect to the horse and the ox, and, accordingly, it waits till the animal is asleep. The injuries which it inflicts are usually mortal. To bite off the tail of the ox seems to be its delight. The Hyæna Dog is smaller and slenderer than the hyæna or the wolf. In colour it is of a reddish or yellowish brown, variously mottled, along the sides of the body, and on the legs, in large patches of intermingled black and white. From its completely black nose and muzzle, a strong black line passes up the centre of the forehead to between the ears, which are very large, black on both surfaces, and furnished with a broad and expanded tuft of long whitish hairs, filling a considerable part of their concavity. Its tail, of moderate length, is covered with long bushy hair, divided in the middle by a ring of black. Its ferocity seems to be untameable. Mr. Burchell, who first carried it to England, kept one for twelve months, at the end of which period even its feeder did not dare to lay his hand upon it.

THE ESQUIMAUX DOG.*



THIS animal is one of those varieties of the Dog, from which man receives obedience and affection. To the Esquimaux

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* This animal is a native of America, and is considered by Godman, as descended from the wolf and the fox. He observes that they retain so much of the external appearance, and general carriage of the wild animal, as to leave no question of their descent from the same stock of the wolf, residing in the vicinity, and do not appear to be distantly removed from that species, however long they may have been in the service of man.

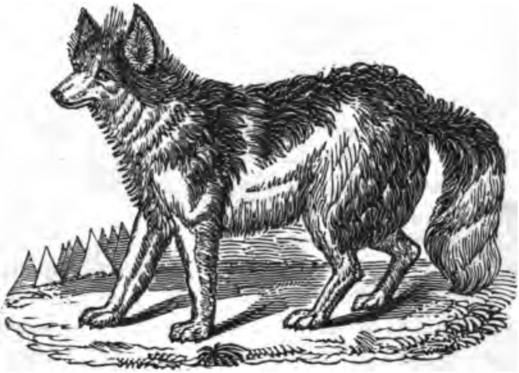
Indians his services are invaluable. He assists them to hunt the bear, the rein-deer, and the seal: in summer, while attending his master in the chase, he carries a weight of thirty pounds; in winter he is yoked to a sledge, and conveys his master over the trackless snows. Several of them drawing together will convey five or six persons, at the rate of seven or eight miles an hour, and will travel sixty miles in a day. In winter he is scantily fed, and roughly treated, yet his fidelity remains unshaken. The Esquimaux Dog does not bark. In appearance he comes nearest to the shepherd's Dog and the wolf Dog. His ears are short and erect, and his bushy tail curves elegantly over his back. His average stature is one foot ten inches, and the length of his body, from the back of the head to the commencement of the tail, is two feet three inches. His coat is long and furry, and is sometimes brindled, sometimes of a dingy red, sometimes black and white, and sometimes almost wholly black.

The manner in which the sledge is drawn by these animals is described with much accuracy and spirit by Captain Parry, in the Journal of his Second Voyage. "When drawing a sledge (says he), the Dogs have a simple harness (annoo) of deer or seal skin, going round the neck by one bight, and another for each of the fore legs, with a single thong leading over the back, and attached to the sledge as a trace. Though they appear at first sight to be huddled together without regard to regularity, there is, in fact, considerable attention paid to their arrangement, particularly in the selection of a Dog of peculiar spirit and sagacity, who is allowed, by a longer trace, to precede the rest as leader, and to whom, in turning to the right or left, the driver usually addresses himself. This choice is made without regard to age or sex, and the rest of the Dogs take precedency according to their training or sagacity, the least effective being put nearest the sledge. The leader is usually from eighteen to twenty feet from the fore part of the sledge, and the hindmost Dog about half that distance; so that when ten or twelve are running together, several are nearly abreast of each other. The driver sits quite low, on the fore part of the sledge, with his feet overhanging the snow on one side, and having in his hand a whip, of which the handle is plaited a little way down to stiffen it, and give it a spring, on which much of its use depends; and that which composes the lash is chewed by the women, to make it flexible in frosty weather. The men acquire from their youth considerable expertness in the use of this whip, the lash of which is left to trail along the ground by the side of the sledge, and with which they can inflict a very severe blow on any Dog at pleasure. Though the Dogs are kept in training entirely by fear of the whip, and, indeed, without it, would soon have their own way, its immediate effect is always detrimental to the draught of the sledge; for not only does the individual that is struck draw back, and slacken his trace, but generally turns upon his next neighbour, and this passing on to the next, occasions a general divergency, accompanied by the usual yelping and showing of the teeth. The Dogs then come together again by degrees, and the draught of the sledge is accelerated; but even at the best of times, by his rude mode of draught, the traces of one third of the Dogs form an angle of thirty or forty degrees on each side of the direction in which the sledge is advancing. Another great inconvenience attending the Esquimaux method of putting the Dogs to, besides that of not employing their strength to the best advantage, is the constant entanglement of the traces, by the Dogs repeatedly doubling under from side to side to avoid the whip; so that, after running a few miles, the traces always require to be taken off and cleaned.

"In directing the sledge, the whip acts no very essential part, the driver for this purpose using certain words, as the carters do with us, to make the Dogs turn more to the right or left. To these a good leader attends with admirable precision, especially if his own name be repeated at the same time, looking behind over his shoulder with great earnestness, as if listening to the directions of the driver. On a beaten track, or even where a single foot or sledge mark is occasionally discernible, there is not the slightest trouble in guiding the Dogs: for even in the darkest night, and in the heaviest snow-drift, there is little or no danger of their losing the road, the leader keeping his nose near the ground, and directing the rest with wonderful sagacity. Where, however, there is no beaten track, the best driver among them makes a terrible circuitous course, as all the Esquimaux roads plainly show; these generally occupying an extent of six miles, when, with a horse and sledge, the journey would scarcely have amounted to five. On rough ground, as among hummocks of ice, the sledge would be frequently overturned, or altogether stopped, if the driver did not repeatedly get off, and by lifting or drawing it on one side, steer clear of those accidents. At all times, indeed, except on a smooth and well made road, he is pretty constantly employed thus with his feet, which, together with his never-ceasing vociferations, and frequent use of the whip, renders the driving of one of these vehicles by no means a pleasant or easy task. When the driver wishes to stop the sledge, he calls out, 'Wo, woa,' exactly as our carters do, but the attention paid to this command depends altogether on his ability to enforce it. If the weight is small and the journey homeward, the Dogs are not to be thus delayed; the driver is therefore obliged to dig his heels into the snow to obstruct their progress, and having thus succeeded in stopping them, he stands up with one leg before the foremost cross-piece of the sledge, till, by means of laying the whip gently over each Dog's head, he has made them all lie down. He then takes care not to quit his position, so that should the Dogs set off, he is thrown upon the sledge instead of being left behind by them.

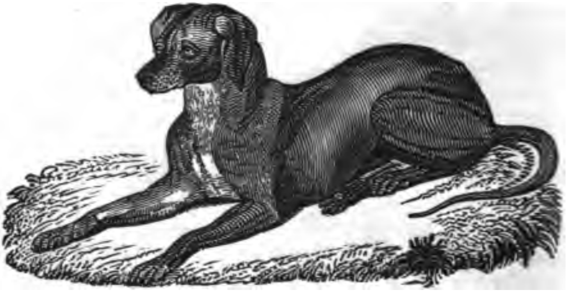
"With heavy loads, the Dogs draw best with one of their own people, especially a woman, walking a little way ahead; and in this case they are sometimes enticed to mend their pace by holding a mitten to the mouth, and then making the motion of cutting it with a knife and throwing it on the snow, when the dogs mistaking it for meat, hasten forward to pick it up. The women also entice them from the huts in a similar manner. The rate at which they travel depends, of course, on the weight they have to draw, and the road on which their journey is performed. When the latter is level, and very hard and smooth, constituting what, in other parts of North America, is called 'good sleighing,' six or seven Dogs will draw from eight to ten hundred weight, at the rate of seven or eight miles an hour, for several hours together; and will easily, under these circumstances, perform a journey of fifty or sixty miles a day. On untrodden snow, five-and-twenty or thirty miles would be a good day's journey. The same number of well fed Dogs, with a weight of five or six hundred (that of the sledge included), are almost unmanageable, and will, on a smooth road, run any way they please, at the rate of ten miles an hour. The work performed by a greater number of Dogs is, however, by no means in a proportion to this, owing to the imperfect mode already described of employing the strength of these sturdy creatures, and to the more frequent snarling and fighting occasioned by an increase of numbers."

THE HARE INDIAN DOG.



THIS Dog, which also bears the name of the Mackenzie River Dog, appears to be peculiar to the Hare Indians and the other tribes which frequent the banks of the Great Bear Lake and the Mackenzie River in North America. The Indians among whom they are bred, derive their subsistence almost wholly from the chase, and this species of Dog materially aids them in the pursuit of the game, as its broad feet and light make, enable it to run over the snow without sinking, however slight may be the crust which is on the snow. The animal is an exceedingly graceful and good tempered creature, of small size, slenderly made, with long and delicate legs, and a thick bushy tail slightly curved upward. It has a narrow, elongated, pointed muzzle, covered with white and very short hair; erect ears, broad at the base, and pointed at the tip; and long straight hair on the body, the ground colour of which is white, marked with large irregular patches of grayish black, intermingled with various shades of brown.

THE AFRICAN BLOODHOUND.



There are now in the Tower of London, two males and a female of this species—a species which is remarkable for its elegance and its sagacity. They were brought from Africa, by Major Denham. While he was in that country he frequently employed them in hunting the gazelle; in performing which they displayed infinite skill. After a lapse of an hour and a half or even two hours, they would follow the scent; and they would often quit the line of it, to cut off a double, or, in other words, to shorten the distance, and would recover it with the greatest ease. This Dog is used in Africa to track a flying foe to his retreat. Captivity has rendered the female surly, and has deprived the whole of them of the desire to perpetuate their race.

THE BLOODHOUND

Is a tall, beautifully formed animal, usually of a reddish or brown colour, which was anciently in high esteem in England. His employ was to recover any game that had escaped wounded from the hunter, or had been stolen out of the forest; but he was still more serviceable in hunting thieves and robbers by their footsteps. For the latter purpose they are now almost disused in that country; but they are still sometimes employed in the royal forests to

track deer stealers, and on such occasions they display an extraordinary sagacity and acuteness of scent. In the Spanish West India islands, however, they are constantly used in the pursuit of criminals, and are accompanied by officers called chasseurs.

THE AUSTRALIAN DOG.

THIS Dog, which is also called the Australasian and New Holland Dog, and by the natives, the Dingo, is about equal in size, and similar in its proportions, to the common House Dog, or Lurcher. It is two feet five inches in length, muscular legged, agile, and courageous, with a bushy tail, and long straight hair, of a deep fawn colour on the upper parts, and almost white on the under surface. He is exceedingly voracious and fierce. One of them has been known to leap on the back of an ass, which was not saved from it without considerable difficulty.

THE MASTIFF.

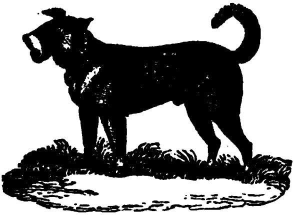
THIS species of Dog is peculiar to England. It is nearly of the size of a Newfoundland Dog, strong and active, possessing great sagacity, and is commonly employed as a watch Dog. The Mastiff is said seldom to use violence against intruders, unless resisted, and even then he will sometimes only throw down the person, and hold him for hours, without doing him further injury, till he is relieved.

He has a large head, with short pendent ears, and thick lips hanging down on each side. In the reign of James I. a contest was exhibited between three Mastiffs and a lion, in which the king of beasts was compelled to seek for safety in flight.

THE BULLDOG.

THOUGH much less in size than the mastiff, the Bulldog is nearly equal to him in strength, and superior to him in firerceness. Those of the brindled kind are accounted the best. No natural antipathy can exceed that of this animal against the bull. Without barking, he will naturally fly at and seize the fiercest bull; running directly at his head, and sometimes catching hold of his nose, he will pin the bull to the ground; nor can he, without great difficulty, be made to quit his hold. Such is his rage, that at a bull fight in the north of England, a brute in the shape of a man wagered, that he would successively cut off the feet of his Dog, and that the animal should return to the attack after each amputation. The horrible experiment was tried, and the wager was won. Two of these Dogs, let loose, at once, are a match for a bull, three for a bear, and four for a lion.

THE TERRIER



Is a small thickset hound, of which there are two varieties; the one with short legs, long back, and commonly of a black or yellowish colour mingled with white; the other more sprightly in appearance, with a shorter body, and the colour reddish brown or black. It has a most acute sense of smelling, and an inveterate enmity to all kinds of vermin. Nor is it excelled by any Dog in the quality of courage. It will encounter even the badger with the utmost bravery, though it often receives severe wounds in the contest, which, however, it bears with unshrinking fortitude. As it is very expert in forcing foxes and other game out of their coverts, and is particularly hostile to the fox, it is generally an attendant on every pack of hounds; in which case the choice of the huntsman is not directed by the size of the animal, but by its strength and power of endurance.

THE HARRIER

Is closely allied to the beagle, though larger, more swift, and vigorous. It is ardent in the chase, and frequenty outstrips the fleetest sportsman. A mixed breed, between this and the large terrier, forms a strong, active, and hardy hound, which is used in hunting the otter. It is rough wire-haired, thick-quartered, long-eared, and thin-shouldered.

THE COACH DOG.

This animal is one of great beauty, its colour being white, elegantly and profusely marked with round black spots. It has been called, but erroneously, the Danish Dog, and Buffon makes it of Bengalian origin, but Pennant declares that it is derived from Dalmatia, in European Turkey. It is, indeed, often denominated the Dalmatian Dog. By some it is said to be the common harrier of Italy, and to have been known and domesticated in that country for two centuries. Its power of smelling is but indifferent, and it is generally kept in genteel houses as a handsome attendant on a carriage.

THE SPANISH POINTER

Is derived, as its name implies, from Spain, but has long been naturalized in England, where great attention has been paid to preserve the breed in all its purity. It is remarkable for the aptness and facility, with which it receives instruction, and may be said to be almost self-taught; whilst the English Pointer requires the greatest care and attention in breaking and training for the sport. But on the other hand, it is less capable than the English Pointer of enduring fatigue. It is chiefly employed in finding partridges, pheasants, &c.

THE SPANIEL.

THIS beautiful animal is of Spanish extraction, whence it derives its name, and the silky softness of its coat. It is elegant in form, with long pendent ears, and hair gracefully curled or waved. Its scent is keen, and it possesses in the fullest perfection the good qualities of sagacity, docility, and attachment. So strong is the latter, that instances have been known in which the animal has died of grief for the loss of its master. Dash, a Spaniel belonging to the gamekeeper of the Rev. Mr. Corsellis, would not quit his master's bed after his death; being taken away, he perpetually returned to the room, and daily visited the grave; and, in spite of all the kindness that was shown to him, he died at the end of fourteen days. The Land Spaniel may be taught a variety of tricks, such as fetching, carrying, and diving. He is employed in setting for partridges, quails, &c. and his steadiness and patience, in the performance of this task, are worthy of admiration. There is another variety of this kind called the **Slater**, used in hawking, to spring the game; but it is much inferior in speed and perseverance to the former.

THE WATER SPANIEL.

Of all the Dog kind, this animal seems to be the most docile, and the most attached to man. Many other species are impatient of correction; but the Water Spaniel, though fierce to strangers, bears blows and ill usage from his master, with undiminished affection. This creature is well calculated for hunting of otters, ducks, &c. Watching the stroke of the piece, and perceiving the game that is shot, he instantly swims after it, and brings it to his master. He will fetch and carry at command, and will dive to the bottom of deep water in search of a piece of money, which he will bring out, and deposit at the feet of the person by whom he was sent. Cowper has recorded, in a pleasing poem, an instance of sagacity and of a desire to gratify a master, which was displayed by his Spaniel Beau. As he was walking by the Ouse, he was desirous to obtain one of the waterlilies, which grew in the river, but was unable to reach it. Beau seemed disposed to assist him, but the poet called him off, and pursued his ramble. On his return, however, Beau rushed into the stream, cropped a lily, and laid it at his master's feet.

THE ENGLISH SETTER

Is considered as one of the most valuable of our hunting Dogs; it being hardy, nimble, and handsome, and possessed of exquisite scent and sagacity. His manner of seeking game is at once correctly and poetically described, in the following lines by Somerville:

"When autumn smiles, all-beauteous in decay,
And paints each chequered grove with various hues,
My SETTER ranges in the new-shorn fields—
His nose in air erect; from ridge to ridge
Panting he bounds, his quarter'd ground divides
In equal intervals, nor careless leaves
One inch untried: at length the tainted gales
His nostrils wide inhale: quick joy elates
His beating heart, which, awed by discipline
Severe, he dares not own, but cautious creeps
Low cowering, step by step, at last attains
His proper distance: there he stops at once,
And points with his instructive nose upon
The trembling prey."

THE BEAGLE.

THIS is the smallest kind of Dog that is used in the chase, and is chiefly employed in hare hunting. It is remarkable for the musical melody of its tone, and the keenness of its scent. Of this Dog there are two varieties, the ROUGH BEAGLE and the SMOOTH BEAGLE.

THE SPRINGER

Is a lively and pleasant species of Dog; very expert in raising woodcocks and snipes from their haunts in woods and marshes, through which it ranges with untiring perseverance. Buffon gives the name of PYRAME to a variety of this Dog, which is distinguished by a patch of red on the legs, and another over each eye.

Of the same kind is that elegant little Dog, which, in England, is well known under the appellation of KING

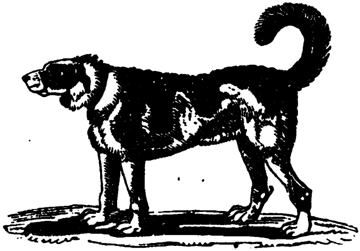
Charles's Dog; as having been the favourite companion of that monarch, who scarcely ever walked out without being attended by several of them. It has a small rounded head, with a short snout, the tail is curved back, the hair is curled, the ears are long, and the feet are webbed.

The Large Water Dog is of an analogous breed, but is less handsome. It has curly hair, which bears a great resemblance to wool, and it swims excellently, in consequence of the webs between the toes being much larger than those of most other Dogs. It is often kept on board of ships, for the purpose of recovering articles which chance to fall into the water.

THE GREYHOUND.

This elegantly formed animal was once held in such estimation, that it was the peculiar companion of a gentleman, who was anciently known by his horse, his hawk, and his Greyhound. In such repute was it, that Canute enacted a law that it should not even be kept by any one who was under the rank of a gentleman. It has a long body, a neat and elongated head, full eye, long mouth, sharp and very white teeth, little ears, with thin gristles in them, a straight neck, and full breast; his fore and hind legs are long and straight; his ribs round, strong, and full of sinews, and taper about the belly. It is the swiftest of the Dog kind, and easily trained for the chase when twelve months old. It courses by sight and not by scent, as other hounds do; and is supposed to outlive all the Dog tribe. Buffon imagines it to be descended from the Irish Greyhound, only rendered more thin and delicate by the influence of climate. There is a variety of this species, which is called the **Highland Greyhound**. It is very large, strong, deep-chested, covered with long rough hair, and has the scent and sagacity of the bloodhound. This kind has become exceedingly scarce.

THE NEWFOUNDLAND DOG.



This animal, which came originally from the island whence it derives its name, has a remarkably pleasing countenance, is exceedingly docile, and of great size and sagacity. In their native country, they are extremely useful to the settlers on the coast, who employ them to bring wood from the interior. Three or four of them, yoked to a sledge, will draw three hundred weight of wood for several miles. In the performance of this task they are so expert as to need no driver. After having delivered their load, they will return to the woods with the empty sledge, and are then rewarded by being fed with dried fish.

The feet of this Dog are more palmated than usual; which structure enables it to swim very fast, to dive easily, and to bring up any thing from the bottom of the water. It is, indeed, almost as fond of the water as if it were an amphibious animal. So sagacious is it, and so prompt in lending assistance, that it has saved the lives of numberless persons, who were on the point of drowning; and this circumstance, together with its uniform good temper, has justly rendered it a universal favourite.

Volumes have been filled with anecdotes of the sagacity and affection of Dogs, and as many more might be filled. We will confine ourselves to a few, in addition to those which we have already given.

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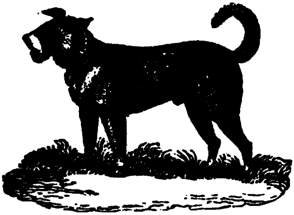
He has a large head, with short pendent ears, and thick lips hanging down on each side. In the reign of James I. a contest was exhibited between three Mastiffs and a lion, in which the king of beasts was compelled to seek for safety in flight.

THE BULLDOG.

Though much less in size than the mastiff, the Bulldog is nearly equal to him in strength, and superior to him in firerceness. Those of the brindled kind are accounted the best. No natural antipathy can exceed that of this animal against the bull. Without barking, he will naturally fly at and seize the fiercest bull; running directly at his head, and sometimes catching hold of his nose, he will pin the bull to the ground; nor can he, without great difficulty, be made to quit his hold. Such is his rage, that at a bull fight in the north of England, a brute in the shape of a man wagered, that he would successively cut off the feet of his Dog, and that the animal should return to the attack after each amputation. The horrible experiment was tried, and the wager was won. Two of these Dogs, let loose, at once, are a match for a bull, three for a bear, and four for a lion.

THE TERRIER



Is a small thickset hound, of which there are two varieties; the one with short legs, long back, and commonly of a black or yellowish colour mingled with white; the other more sprightly in appearance, with a shorter body, and the colour reddish brown or black. It has a most acute sense of smelling, and an inveterate enmity to all kinds of vermin. Nor is it excelled by any Dog in the quality of courage. It will encounter even the badger with the utmost bravery, though it often receives severe wounds in the contest, which, however, it bears with unshrinking fortitude. As it is very expert in forcing foxes and other game out of their coverts, and is particularly hostile to the fox, it is generally an attendant on every pack of hounds; in which case the choice of the huntsman is not directed by the size of the animal, but by its strength and power of endurance.

THE HARRIER

Is closely allied to the beagle, though larger, more swift, and vigorous. It is ardent in the chase, and frequenty outstrips the fleetest sportsman. A mixed breed, between this and the large terrier, forms a strong, active, and hardy hound, which is used in hunting the otter. It is rough, wire-haired, thick-quartered, long-eared, and thin-shouldered.

THE COACH DOG.

This animal is one of great beauty, its colour being white, elegantly and profusely marked with round black spots. It has been called, but erroneously, the Danish Dog, and Buffon makes it of Bengalian origin, but Pennant declares that it is derived from Dalmatia, in European Turkey. It is, indeed, often denominated the Dalmatian Dog. By some it is said to be the common harrier of Italy, and to have been known and domesticated in that country for two centuries. Its power of smelling is but indifferent, and it is generally kept in genteel houses as a handsome attendant on a carriage.

THE SPANISH POINTER

Is derived, as its name implies, from Spain, but has long been naturalized in England, where great attention has been paid to preserve the breed in all its purity. It is remarkable for the aptness and facility, with which it receives instruction, and may be said to be almost self-taught; whilst the English Pointer requires the greatest care and attention in breaking and training for the sport. But on the other hand, it is less capable than the English Pointer of enduring fatigue. It is chiefly employed in finding partridges, pheasants, &c.

THE SPANIEL.

This beautiful animal is of Spanish extraction, whence it derives its name, and the silky softness of its coat. It is elegant in form, with long pendent ears, and hair gracefully curled or waved. Its scent is keen, and it possesses in the fullest perfection the good qualities of sagacity, docility, and attachment. So strong is the latter, that instances have been known in which the animal has died of grief for the loss of its master. Dash, a Spaniel belonging to the gamekeeper of the Rev. Mr. Corsellis, would not quit his master's bed after his death; being taken away, he perpetually returned to the room, and daily visited the grave; and, in spite of all the kindness that was shown to him, he died at the end of fourteen days. The Land Spaniel may be taught a variety of tricks, such as fetching, carrying, and diving. He is employed in setting for partridges, quails, &c. and his steadiness and patience, in the performance of this task, are worthy of admiration. There is another variety of this kind called the **Slater**, used in hawking, to spring the game; but it is much inferior in speed and perseverance to the former.

THE WATER SPANIEL.

Of all the Dog kind, this animal seems to be the most docile, and the most attached to man. Many other species are impatient of correction; but the Water Spaniel, though fierce to strangers, bears blows and ill usage from his master, with undiminished affection. This creature is well calculated for hunting of otters, ducks, &c. Watching the stroke of the piece, and perceiving the game that is shot, he instantly swims after it, and brings it to his master. He will fetch and carry at command, and will dive to the bottom of deep water in search of a piece of money, which he will bring out, and deposit at the feet of the person by whom he was sent. Cowper has recorded, in a pleasing poem, an instance of sagacity and of a desire to gratify a master, which was displayed by his Spaniel Beau. As he was walking by the Ouse, he was desirous to obtain one of the waterlilies, which grew in the river, but was unable to reach it. Beau seemed disposed to assist him, but the poet called him off, and pursued his ramble. On his return, however, Beau rushed into the stream, cropped a lily, and laid it at his master's feet.

THE ENGLISH SETTER

Is considered as one of the most valuable of our hunting Dogs; it being hardy, nimble, and handsome, and possess-d of exquisite scent and sagacity. His manner of seeking game is at once correctly and poetically described, in the following lines by Somerville:

> "When autumn smiles, all-beauteous in decay,
> And paints each chequered grove with various hues,
> My SETTER ranges in the new-shorn fields—
> His nose in air erect; from ridge to ridge
> Panting he bounds, his quarter'd ground divides
> In equal intervals, nor careless leaves
> One inch untried: at length the tainted gales
> His nostrils wide inhale: quick joy elates
> His beating heart, which, awed by discipline
> Severe, he dares not own, but cautious creeps
> Low cowering, step by step, at last attains
> His proper distance: there he stops at once,
> And points with his instructive nose upon
> The trembling prey."

THE BEAGLE.

This is the smallest kind of Dog that is used in the chase, and is chiefly employed in hare hunting. It is remarkable for the musical melody of its tone, and the keenness of its scent. Of this Dog there are two varieties, the ROUGH BEAGLE and the SMOOTH BEAGLE.

THE SPRINGER

Is a lively and pleasant species of Dog; very expert in raising woodcocks and snipes from their haunts in woods and marshes, through which it ranges with untiring perseverance. Buffon gives the name of PYRAME to a variety of this Dog, which is distinguished by a patch of red on the legs, and another over each eye.

Of the same kind is that elegant little Dog, which, in England, is well known under the appellation of KING

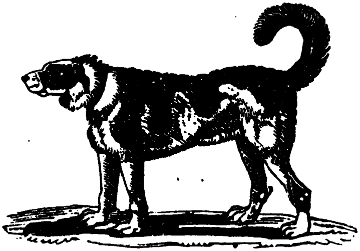
CHARLES'S DOG; as having been the favourite companion of that monarch, who scarcely ever walked out without being attended by several of them. It has a small rounded head, with a short snout, the tail is curved back, the hair is curled, the ears are long, and the feet are webbed.

The LARGE WATER DOG is of an analogous breed, but is less handsome. It has curly hair, which bears a great resemblance to wool, and it swims excellently, in consequence of the webs between the toes being much larger than those of most other Dogs. It is often kept on board of ships, for the purpose of recovering articles which chance to fall into the water.

THE GREYHOUND.

THIS elegantly formed animal was once held in such estimation, that it was the peculiar companion of a gentleman, who was anciently known by his horse, his hawk, and his Greyhound. In such repute was it, that Canute enacted a law that it should not even be kept by any one who was under the rank of a gentleman. It has a long body, a neat and elongated head, full eye, long mouth, sharp and very white teeth, little ears, with thin gristles in them, a straight neck, and full breast; his fore and hind legs are long and straight; his ribs round, strong, and full of sinews, and taper about the belly. It is the swiftest of the Dog kind, and easily trained for the chase when twelve months old. It courses by sight and not by scent, as other hounds do; and is supposed to outlive all the Dog tribe. Buffon imagines it to be descended from the Irish Greyhound, only rendered more thin and delicate by the influence of climate. There is a variety of this species, which is called the HIGHLAND GREYHOUND. It is very large, strong, deep-chested, covered with long rough hair, and has the scent and sagacity of the bloodhound. This kind has become exceedingly scarce.

THE NEWFOUNDLAND DOG.



THIS animal, which came originally from the island whence it derives its name, has a remarkably pleasing countenance, is exceedingly docile, and of great size and sagacity. In their native country, they are extremely useful to the settlers on the coast, who employ them to bring wood from the interior. Three or four of them, yoked to a sledge, will draw three hundred weight of wood for several miles. In the performance of this task they are so expert as to need no driver. After having delivered their load, they will return to the woods with the empty sledge, and are then rewarded by being fed with dried fish.

The feet of this Dog are more palmated than usual; which structure enables it to swim very fast, to dive easily, and to bring up any thing from the bottom of the water. It is, indeed, almost as fond of the water as if it were an amphibious animal. So sagacious is it, and so prompt in lending assistance, that it has saved the lives of numberless persons, who were on the point of drowning; and this circumstance, together with its uniform good temper, has justly rendered it a universal favourite.

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"In the year 1791, a person went to a house in Deptford, to take lodgings, under pretence that he had just arrived from the West Indies; and, after having agreed on the terms, said he should send his trunk that night, and come himself the next day. About nine o'clock in the evening, the trunk was brought by two porters, and was carried into a bed-room. Just as the family were going to bed, their little house Dog, deserting his usual station in the shop, placed himself close to the chamber-door where the chest was deposited, against which it scratched and barked with redoubled fury. They attempted to get the Dog out of the room, but in vain. Calling in some neighbours, and making them eyewitnesses of the circumstances, they began to move the trunk about; when they quickly discovered that it contained something that was alive. Suspicion becoming very strong, they were induced to force it open; when, to their utter astonishment, they found in it their new lodger, who had been thus conveyed into the house with the intention of robbing it.

"A Dog that had been the favourite of an elderly lady, discovered, some time after her death, the strongest emotions at the sight of her picture, when it was taken down to be cleaned. Before this, he had never been observed to notice the painting. Here was evidently a case of passive remembrance, or of the involuntary renewal of former impressions. Another Dog, the property of a gentleman that died, was given to a friend in Yorkshire. Several years afterwards, a brother from the West Indies paid a short visit at the house where the Dog then was. He was instantly recognized, though an entire stranger, in consequence, probably, of a strong personal likeness. The Dog fawned upon him, and followed him with great affection to every place where he went."

At the convent of the Great St. Bernard the sagacity and courage of the Dog are employed for a noble purpose. The benevolent monks of that convent have a fine breed of Dogs, the Alpine spaniel, which they use to discover travellers who, in passing the Alps, have fallen benumbed on the snow, or into the clefts, which often occur. "It is then that the keen scent and exquisite docility of these admirable Dogs are called into action. Though the perishing man lie ten or even twenty feet beneath the snow, the delicacy of smell with which they can trace him affords a chance of escape. They scratch away the snow with their feet; they set up a continued hoarse and solemn bark, which brings the monks and labourers of the convent to their assistance. To provide for the chance that the Dogs, without human help, may succeed in discovering the unfortunate traveller, one of them has a flask of spirits round his neck, to which the fainting man may apply for support; and another has a cloak to cover him. These wonderful exertions are often successful; and even when they fail of restoring him who has perished, the Dogs discover the body, so that it may be secured for the recognition of friends; and such is the effect of the temperature, that the dead features generally preserve their firmness for the space of two years. One of these noble creatures was decorated with a medal, in commemoration of his having saved the lives of twenty-two persons, who, but for his sagacity, must have perished."

A surgeon of Leeds found a little spaniel who had been lamed. He carried the poor animal home, bandaged up his leg, and, after two or three days, turned him out. The dog returned to the surgeon's house every morning, till his leg was perfectly well. At the end of several months, the spaniel again presented himself, in company with another dog, who had also been lamed; and he intimated, as well as piteous and intelligent looks could intimate, that he desired the same kind assistance to be rendered to his friend, as had been bestowed upon himself. A similar circumstance is stated to have occurred to Moraut, a celebrated French surgeon.

The following is an account of a singular friendship which subsisted between a China goose and a pointer, who had killed the gander. "Ponto (for that was the Dog's name) was most severely punished for the misdemeanour, and had the dead bird tied to his neck. The solitary goose became extremely distressed for the loss of her partner and only companion; and, probably, having been attracted to the Dog's kennel by the sight of her dead mate, she seemed determined to persecute Ponto by her constant attendance and continual vociferations; but after a little time a strict amity and friendship subsisted between these incongruous animals. They fed out of the same trough, lived under the same roof, and in the same straw-bed kept each other warm; and when the Dog was taken to the field, the inharmonious lamentations of the goose for the absence of her friend were incessant."

The stories of attachment between lions and Dogs are well authenticated. In a well-regulated travelling menagerie, in England, belonging to a person named Atkins, there was in the autumn of 1828, a spaniel-bitch, affording sustenance to a young tiger that was sick, and not expected to live, and which she evidently tended with affectionate solicitude.

In the year 1825, there was a Dog constantly to be seen in St. Bride's Churchyard, Fleet-street, which for two years had refused to leave the place where his master was buried. He did not appear miserable;—he evidently recollected their old companionship, and he imagined that their friendship would again be renewed. The inhabitants of the houses round the church daily fed the poor creature, and the sexton built him a little kennel. But he would never quit the spot;—and there he died.

THE CAT,

Though an animal of prey, is a useful domestic. It is neither wanting in sagacity nor sentiment; but its attachments are stronger to places than to persons. The form of its body corresponds with its disposition. The Cat is handsome, light, adroit, cleanly, and voluptuous: he loves ease, and searches out the softest furniture in order to repose on, and rest himself.

Cats go with young fifty-five or fifty-six days; they are not so prolific as dogs, and their usual number is four, five, or six. Young Cats are gay, lively, pretty, and would be very proper to amuse children, if the strokes of their paws were not to be feared. Their disposition, which is an enemy to all restraint, renders them incapable of a regular education. We are told, nevertheless, of the Greek Friars of Cyprus having taught Cats to hunt, take, catch, and destroy the serpents with which that island was infested; their scent, which in the dog is an eminent quality, is far from being good, and therefore they do not pursue animals which they no longer see; they do not hunt, but wait and attack them by surprise.

The most immediate physical cause of this inclination, which they have to spy out, and surprise other animals, comes from the advantage which they receive from the particular conformation of their eyes. The pupil, in man, as well as in the greater part of animals, is capable of a certain degree of contraction and dilatation; it enlarges a little when there is no light, and contracts when it becomes too strong.

In the eye of the Cat, and of nocturnal birds, this contraction and dilatation are so considerable, that the pupil, which in obscurity is large and round, becomes, in broad day, long and narrow like a line; and for this reason these animals see better during the night than during the day, the form of the pupil being always round when it is not constrained. During the day, there is a continual contraction in the eyes of the Cat, and it is only by effort, as it were, that he sees in a strong light; whereas at twilight, the pupil resuming its natural form, he sees perfectly, and profits from this advantage to know, attack, and surprise other animals. The whiskers, too, appear to aid him in the chase, by possessing qualities analogous to those of the antennæ of insects.

Cats seem to have a natural dread of water, cold, and bad smells. They are very fond of perfumes, and gladly suffer themselves to be taken and caressed by persons who use them. The scent of valerian has so powerful and so delicious an effect on them, that they appear transported with pleasure by it; and in order to preserve this plant in gardens, it is common to surround it with a close fence.

Cats will smell it from afar, will run and rub themselves against it, and will pass and repass so often over it, as to destroy it in a short time.

One of the most remarkable properties of a domestic Cat is the anxiety with which it makes itself acquainted, not only with every part of its usual habitation, but with the dimensions and external qualities of every object by which it is surrounded. Cats do not very readily adapt themselves to a change of houses; but we have watched the process by which one, whose attachment to a family is considerable, reconciles itself to such a change.

He surveys every room in the house, from the garret to the cellar; if a door is shut, he waits till it be opened to complete the survey; he ascertains the relative size and position of every article of furniture; and when he has acquired this knowledge, he sits down contented with his new situation. It appears necessary to a Cat that he should be intimately acquainted with every circumstance of his position, in the same way that a general first examines the face of the country in which he is to conduct his operations. If a new piece of furniture, if even a large book or portfolio, is newly placed in a room which a Cat frequents, he walks round it, smells it, takes note of its size and appearance, and then never troubles himself further about the matter.

This is, probably, an instinctive quality; and the wild Cat may, in the same way, take a survey of every tree or stone, every gap in a brake, every path in a thicket, within the ordinary range of its operations. The whiskers of the Cat, as we have mentioned in the case of the lion, enable it to ascertain the space through which its body may pass, without the inconvenience of vainly attempting such a passage.

The memory of a Cat must be very strong, to enable it to understand this great variety of *local* circumstances, after a single observation. The same power of memory leads this animal, much as its affection may be doubted, to know the faces of individuals. We have seen a Cat exhibit manifest delight upon the return of its master, or of a person from whom it had received peculiar kindness. There are several instances of strong attachment to the human race in Cats, though in number and intensity they fall short of the attachment of the dog.

"There was at my house, a little while ago, a Cat seen watching a bird upon the top of a tree, and for some time they mutually fixed their eyes upon each other. At length, the bird let herself fall dead into the Cat's claws, either dazzled and astonished by the force of imagination, or drawn by some attractive power in the Cat."

As they are exceedingly cleanly, and as their coat is always dry and shining, their hair easily electrifies; and sparks are seen to come from it, when rubbed with the hand in any dark place. Their eyes shine in the dark, almost like diamonds, and reflect outwardly during the night, the light which they may be said to have imbibed during the day.*

Among our ancestors, the Cat was held in high estimation for his mousing qualities. In the tenth century, Hoel Dha, or Howel the Good, prince of Wales, enacted laws to regulate the price of animals. The price of a kitten before it could see was one penny; from the time it could see until it caught a mouse, two pence, when it commenced mouser, four pence. In those days, these were considerable sums. It was however, required, that the animal should be perfect in its senses of seeing and hearing, be a good mouser, have the claws whole, and be a good nurse; and if it failed in any of these qualities, the seller was to forfeit to the buyer the third part of its value. If any one stole or killed the Cat that guarded the prince's granary, he was to forfeit a milch ewe, its fleece, and lamb; or as much wheat as when poured on a Cat, suspended by its tail (the head touching the floor) would form a heap high enough to cover the creature to the tip of its tail.

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* Recent observations render it very doubtful whether the eye of the Cat possesses an inherent phosphorescent lustre. It appears that to render the Cat's eye luminous, light must be present; though the slightest ray will produce the shining effect. ED.

Cats may be taught to perform tricks, such as leaping over a stick, but they always do such feats unwillingly. There is an exhibition of Cats in Regent-street, London, where the animals, at the bidding of their master, an Italian, turn a wheel, draw up a bucket, ring a bell, and, in doing these things, begin, continue, and stop, as they are commanded. But the *commencez*, *continuez*, *arrêtez*, of their keeper is always enforced with a threatening eye, and often with a severe blow; and the poor creatures exhibit the greatest reluctance to proceed with their unnatural employments. They have a subdued and piteous look; but the scratches upon their master's arms, show that *his* task is not always an easy one.

"At Elford, near Lichfield, in England, the Rev. Mr. Sawley had taken the young ones from a hare which had been shot. His Cat, which had just lost her own kittens, carried them away, as it was supposed, to eat them; but it presently appeared that it was affection, not hunger, which incited her, as she suckled them and brought them up as their mother."

THE WILD CAT.

In Europe but one species of the *Wild Cat* is known; and it appears from the testimony of travellers, that this species is found in almost all climates, without any great variety. There were some of them on the continent of the New World before it was discovered: a huntsman carried one which he had found in the woods to Christopher Columbus; this Cat was of the common size, the hair of a dark gray, with the tail very long and very strong.* There are some of the same sort of Wild Cats in Peru, though they had no tame ones; and there are also some in Canada, in the country of the Illinois, &c. They have been seen in several parts of Africa, as in Guinea, at the Gold Coast; at Madagascar, where the original inhabitants had even domestic Cats; at the Cape of Good Hope, where, Kolben says, there are also, though in a small number, Wild Cats of a blue colour; and these blue, or rather slate-coloured Cats, are found again in Asia.

In England the WILD or WOOD CAT, is the fiercest and most destructive of predatory animals, and may not improperly be denominated the British tiger. At its full growth, it stands a foot and a half in height, measures nearly two feet round the body, and, including the tail, which is half a yard long, it is about four feet in length. A larger head, more vividly sparkling eyes, and a more agile and daring demeanour, distinguish it from the domestic species. Its colour is of a yellowish brown; the head, back, sides, and tail, being marked transversely with bars of deep brown and black. It is a very solitary animal. Merely to wound them is dangerous, as they will turn furiously on their assailant, and they have strength enough to render themselves formidable. In spite, however, of their strength and agility, they are often vanquished by a much smaller enemy. That enemy is the Pine Martin. The combat between the two animals is well described by the author of a recent valuable work, The British Naturalist. "The onset," says he "is one of some skill on both sides. The aim of the Cat is to pounce with her paws upon the head of the martin, in such a way as that the claws may destroy or wound its eyes, while her teeth are embedded in its neck; and if she can accomplish that, the fate of the martin is decided. That, however, if done at all, must be done in a moment, and if it be lost, there is no repairing the mistake. The spring of the Wood Cat is larger than that of her opponent, and the Cat takes up her position so that she shall, if possible, alight upon his head with her full spring and impetus. To distract her attention, he keeps moving his head from side to side, and if he succeeds in his object, he rushes to close quarters by a side movement. If the spring of the Cat takes proper effect, there is a struggle, but not of long duration; and it is the same with the opposite result, if the Cat miss and the martin fasten, during the short pause of exhaustion after the spring. Here we may notice another curious feature in the economy of all the feline race. It has been remarked even of the most powerful of them, that if they miss their object when they spring, they sneak cowardly away, and do not return to the attack for some time, if, indeed, they return at all. Now the fact is, that it is not cowardice, but exhaustion; the gnashing with the teeth and the talons seems to be the reaction by which the motion of the spring is balanced, and the tone of the animal kept up; and if it fail in that, it takes a while to recover the use of its springing muscles. Probably the violence both of the spring and the exhaustion are connected in some way or other with the electric state of the body;

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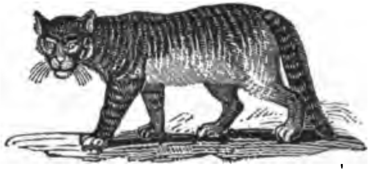

CHAP. IX.

Of certain intermediate Animals between wild and domestic....The Stag, or Red Deer....Of the Fallow-deer, the Roebuck, &c.

THE STAG

Is one of those mild, tranquil, innocent animals, which seem as if they were created solely to adorn and animate the solitude of the forests, and to occupy, remote from man, the peaceful retreats of Nature. His light and elegant form; his flexible yet nervous limbs; his head rather adorned, than armed, with a living substance, which, like the branch of a tree, is every year renewed; his size, his swiftness, his strength, sufficiently distinguish him from the rest of the inhabitants of the forest.

The old Stags shed their horns first, which happens about the end of February or the beginning of March. Stags in their seventh year do not undergo this change ill the middle or the end of March; nor do those in their ixth year, till the month of April.

After they have shed their horns, they separate from each other; the very young ones alone associating together. They remain no longer in covert; they seek the beautiful parts of the country, the groves, and the open coppices, where they remain all the summer, till they recover the antlers which were wont to adorn their brows; and, during this season, they carry their heads low, for fear of striking them against the branches; for they are exceedingly tender till they arrive at perfection. The horns of the oldest Stags are scarcely half repaired by the month of May; nor do they attain their full length and hardness till about the end of July. The horns of the young Stag are very late shed, and very late recovered; but when these are completely lengthened, and are become quite hard, they rub them against the trees, in order to clear them from the scurf with which they are covered.

The Hinds, or females, carry their young eight months and a few days. They are not all prolific; and one sort there is in particular which is always barren. The Fawn retains this appellation no longer than till it is six months old; then the knobs begin to appear, and it takes the name of a Knobber, which it bears till these knobs are lengthened to so many points, whence they are termed Prickets, or Brockets. It does not quit its mother early, though it grows fast, but follows her all the summer. In winter, the Hinds, the Knobbers, the Prickets, and the young Stags resort to the herd, forming troops, which are more numerous in proportion as the season is more severe. In spring they divide, the Hinds retiring to bring forth their young; and at this time there are scarcely any but the Prickets and the young Stags, which

go together. In general, the Stags are inclined to remain with each other, and to roam abroad in companies; it is only from fear or necessity that they are ever found dispersed or separated.

The growth of the horns appears to depend on the redundancy of the fluids, and has a near connexion with the production of the seminal fluid, since, when castrated, the horns of the Stag cease to grow. The beauty of this, as indeed of every part, depends much upon their food: for a Stag which lives in a plentiful country, where he feeds at his ease, where he is neither disturbed by men nor dogs, where, after having eaten without interruption, he may lie down and ruminate in quiet, has always a beautiful head, high, open, palmated, large, and well adorned at top, broad and curled at bottom, with a great number of long and strong antlers; whereas, in a country where he has neither sufficient food nor repose, his head will be in these respects the reverse, insomuch that it is no difficult matter to distinguish, by the horns of a Stag, whether or not he inhabits a plentiful and quiet country, and whether or not he has been well nourished.

The branches which sprout from the head of the Stag, in their make and growth, resemble those of a tree; their substance also is, perhaps, more of the nature of wood than of bone: it is, as it were, a vegetable grafted upon an animal, which partakes of the nature of both, and forms one of those shades by which Nature always approximates two extremes.

The Stag passes his whole life in the alternatives of plentitude and want, of corpulence and leanness, of health and sickness, without having his constitution much affected by the violence of the change; nor is the duration of his life inferior to that of other animals which are not subject to such vicissitudes. As he is five or six years in

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The most common colour of the Stag is yellow, though there are many found of a brown, and many of a red colour. White Stags are much more uncommon, and seem to be Stags become domestic. The colour of the horns, like that of the hair, seems in particular to depend on the nature and age of the animal. The horns of the young Stags are whiter than those of the old ones. Of those Stags also whose hair is of a light yellow, the horns are often of a sallow hue, and disagreeable to the eye.

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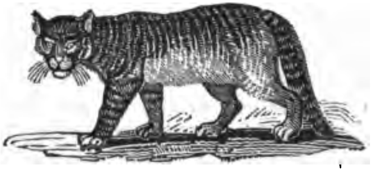

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This animal seems to have good eyes, an exquisite smell, and an excellent ear. When he would hearken to any thing, he raises his head, pricks up his ears, and then he hears from a great distance. When he issues from a little coppice, or some other spot half covered, he stops, in order to take a full view around him, and then snuffs up the wind, in order to try whether he can discover the scent of aught that may give him disturbance. Though naturally rather simple, he is yet far from being destitute of curiosity and cunning. If any one whistles, or calls aloud to him from a great distance, he instantly stops short, and gazes with fixed attention, with even a kind of admiration; and if he sees neither arms nor dogs, he passes along quietly, and without altering his pace. With equal tranquillity and pleasure he seems also to listen to the shepherd's pipe, or flagelet; and the hunters, in order to embolden them, sometimes use these instruments. In general, he fears men much less than he does dogs, and entertains neither distrust nor artifice but in proportion as he is disturbed. He eats slowly, chooses his food, and seeks afterwards to repose himself, that he may ruminate at leisure, though the act of rumination he does not seem to perform with the same ease as the ox; nor is it without undergoing much violence that the Stag can throw up the food contained in his first stomach. He seldom drinks in the winter, and seldomer still in the spring.

In England, the number of Red Deer is diminishing. Windsor Forest was disafforested in 1814, and an immense slaughter of the Deer took place. In Scotland also the race has been thinned. "The Red Deer," says the author of The Menageries, "are now far from numerous, and are seldom if ever seen on the Grampians. This has no doubt arisen from the grazing of sheep and cattle, by which the seclusion the Red Deer are so fond of has been roken in upon, both in the mountains and in the valleys. As the more lucrative occupation of the soil extends into he remoter districts, the race must further and further de-rease: nor is the period at which they will be wholly ex-inct, in all probability, very distant. Red Deer are yet found in Mar Forest and Glenartney; and there are still a considerable number in the west parts of Ross and Sutherland; though the extensive and judicious improvements which, very much to the general advantage of the country, have recently been affected under the Marquis of Stafford, have made them more rare than they were about the end of the last century. Now, unless by a person whom long observation has rendered familiar with their haunts, the country may be traversed without seeing even one. From their fleetness, and the nature of the ground on which they are found, horses and hounds are of no direct use in the chase of them, as the steed would be required to leap precipices of fifty feet, instead of gates of five bars; and the dogs would be constantly tumbling into gullies and ravines, which are cleared by the Deer at one bound. They cannot be driven 'with hound and horn,' as was the case in the days of 'the barons bold;' neither can they be collected and hemmed in, after the somewat similar manner in which the Highland chiefs conducted their sports. Still there are a few places where a person who has been habituated to the occupation, and who does not fear to ground himself in a morass, and will submit to the other pleasures of 'stalking,' may occasionally find a Roe. The most certain time is when the state of the weather is such as to force the herds to the well-heads, where there is brushwood near to cover the marksman.

"The largest forest set apart for Red Deer which exists in Scotland, is the forest of Atholl, where a hundred thousand English acres are given up to them; and upon this large tract neither man, woman, child, sheep, nor oxen are allowed to trespass, with the exception of those parties who are permitted to partake of the mysteries of Deer-stalking.

"The sportsmen, seldom more than two in each party, set forth, accompanied by a keeper who acts as general; and they are followed by two or three Highlanders, carrying spare rifles and leading the Deer hounds. The party is preceded by the keeper, who is about twenty or thirty yards in advance, attentively examining the face of every hill with his telescope, to discover the Deer that may be grazing upon it. Upon detecting a herd, a council of war is held, and the plan of operations determined upon. It is necessary to proceed with much caution, as, independent of the strong sense of smelling, seeing, and hearing, which these animals are endued with, there is always one of the herd, generally a Hind, or female Deer, stationed as sentinel; and, upon the least suspicion being excited, the signal is given, and they are off. Great care is therefore taken, in the approach, to advance up the wind, and to conceal the party by taken advantage of the inequalities of the ground, preserving the strictest silence. It frequently happens that the sportsmen are obliged to make a circuit of some miles, to get near them undetected—at other times they may find that they are in a situation from which they cannot extricate themselves unseen; in that case they must lie down till the herd move into a more favourable position for their purpose. Having arrived as near to them as is possible without detection, the sportsmen, after a careful examination of their rifles, still keeping themselves as much concealed as possible, fire, and continue firing and loading as long as they remain within practicable distance. Eleven out of a herd of fifteen have been known to be killed by one person: the accidental circumstance of an echo, the sound being heard on one side and the flash appear-g on the other, so puzzled the Deer, that they stood still, ll the four last gathered courage and made off. When ounded, large hounds, of a breed between the greyhound nd the bloodhound, are let loose upon the track of their lood, and they never leave it till they have brought the nimal to bay, generally in some stream, where they keep im till the sportsman comes up and dispatches him by hooting him through the head. It is necessary for the unter to be very cautious in approaching him when at bay, nd always to keep him down the stream from where he tands; for if he breaks his bay, he is very likely to attack his pursuer, gore him with his horns, or trample him to pieces with his feet. This is of all European sports the most noble[*] and interesting, as any person who has tried and understands it will testify, heightened as it is by the wildness and beauty of the scenery, the pure invigorating effect of the mountain air, the picturesque dress and appearance of the Highlanders, and the eager interest they take in a pursuit so peculiar to their own hills, and so congenial to their habits."[†]

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[*] That this sport is attractive and interesting may be believed; but to call it *noble* is surely an abuse of words. The chase of the lion or the tiger is, indeed, a noble occupation, because danger is braved and good is achieved. But how can the epithet of *noble* be applicable to a sport which requires only cunning and caution to carry it on, and in which no peril is encountered, except through the stupidity of the sportsman? ED.

[†] It is hardly necessary to say that the stag is not a native of America.

THE FALLOW-DEER.

No two animals can be more nearly allied than the stag and the Fallow-deer; and yet no two animals keep more distinct, or avoid each other with more fixed animosity. They are never seen to herd in the same place; it is even rare, unless they have been transported thither, to find Fallow-deer in a country where stags are numerous. They seem to be of a nature less robust and less savage than the stag: they are found but rarely wild in the forests, and are bred up in parks, where they are, as it were, half domestic.

England is the country of Europe where they most abound; and there their flesh, which dogs are observed to prefer to that of all other animals, is held in no small estimation. It seems to be an animal formed for a temperate climate; for it is never found in Russia, and very rarely in the forests of Sweden, or in any other northern country; and as the Fallow-deer is an animal less savage, more delicate, and, indeed, it may be added, more domestic than the stag, it is likewise subject to a greater number of varieties. Besides the common Deer, and the White Deer, we know of several other kinds still; the Deer of Spain, for example, which are always as large as stags, but whose neck is more slender, whose colour is more obscure, and whose tail is rather black than white underneath, and longer than that of the common deer; the Deer of Virginia,* which are almost as large as those of Spain; other Deer, whose forehead is compressed and flattened between the eyes, whose ears and tail are longer than those of the common Deer, and of whose hind legs the hoofs are marked with a white spot; and others, which are spotted or streaked with white, black, and yellow; and others still, which are entirely black.

The horns of the Buck, like those of the Stag, are shed every year, and take nearly the same time for repairing.

It frequently happens, that a herd of Fallow-deer is seen to divide into parties, and to engage each other with great ardor. Each seems desirous of gaining some favourite spot of the park for pasture, and of driving the vanquished party into the coarser and more disagreeable parts. Each of these factions has its particular chief, namely, the oldest and the strongest of each herd. These lead on to the engagement; and the rest follow under their direction. Their combats are singular enough, from the disposition and conduct by which their mutual efforts seem to be regulated. They attack with order, and support and assault with courage; they come to the assistance of each other; they retire, they rally, and never yield the victory upon a single defeat. The combat is renewed every day, till at length the most feeble side is obliged to give way, and is content to escape to the most disagreeable part of the park, where alone they can find safety and protection. The Fallow-deer may easily be brought to live in stables, and seems to acquire an affection for the horse. One which was kept at Newmarket in England, used to delight in galloping round the course with the racers while the jockeys were exercising them.

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* We shall give this animal a separate notice, from which it will appear that it is a distinct species from the Fallow-deer of Europe.

From the age of two years, till that of fifteen or sixteen, the Fallow-deer is in a condition to produce, and, in fine, resembling the stag in all its natural habits, the greatest difference we find between these two animals, is in the duration of their lives. From the testimony of hunters, it has been mentioned, that the stag lives to the age of thirty-five or forty; and, on the same authority, it is asserted, that the Fallow-deer lives but about twenty years; and as in size the latter is smaller than the stag, so it is probable, that in growth he is somewhat quicker.

Besides the nostrils, the Fallow-deer is furnished with two spiracula, or breathing places, one at the inner corner of each eye, communicating with the nose. By this means it continues to breathe while drinking, which it could not otherwise do, as it plunges its nose deep under water, and retains it there for a considerable time. These spiracles, it is probable, may also be useful to the animals when chased, by enabling it to respire more fully and easily.

THE ROEBUCK.

The stag, as being the most noble among the tenants of the woods, inhabits the most secret parts of the forest were the spreading branches form a lofty covert: while the Roebuck, as being of an inferior species, contents himself with a more lowly residence, and is seldom found but among the thick foliage of young trees and shrubs. But, if this animal is less noble, less strong, and less elevated in stature, he is, however, possessed of more grace, more vivacity, and even more courage, than the stag. Though but a very small animal, yet, when his young are attacked, he faces even the stag himself, and not unfrequently comes off victorious. He is more gay, more handsome, more active: his shape is more full and more elegant, and his figure is more agreeable; his eyes, in particular, are more brilliant, and more animated: his limbs are more supple, his movements quicker; and possessed of equal vigour and agility, he bounds without effort.

So fleet is the Roebuck, that it is nearly impossible to hunt him down; and such are his strength and wind, that he can run unexhausted for several hours. Should he, however, be at length pressed two closely, he resorts to artifice. He retraces his footsteps, backwards and forwards, till his turnings and windings have confused the scent; and, when this is accomplished, he springs aside at one vast bound, and lies flat on his belly among the grass and bushes till the dogs have gone by; nor does he make the least motion, even should they pass close to his nose.

The Roebuck differs from the stag, not only in superior cunning, but also in his natural appetites, his inclinations, and his whole habits of living. Instead of herding together like the latter, the species of the former live in separate families: the sire, the dam, and the young ones, form of themselves a little community, nor do they ever admit a stranger into it. All other animals of the deer kind are inconstant in their affection. The Roebuck never forsakes his mate; and, as they have been generally bred up together, the male and female form for each other the strongest attachment.

The female of this species goes with young five months and a half, and brings forth about the end of April, or the beginning of May. The hind goes more than eight months; and this is a circumstance which alone suffices to prove, that these animals are of a species so different, that they can never intermix, nor produce together an intermediate race. The female separates herself from the male, when she is about to bring forth, retiring into the thickest part of the woods, in order to avoid the wolf, which is her most dangerous enemy. At the expiration of about ten or twelve days, the Fawns, of which there are generally two at a birth, attain strength enough to follow her. when she is threatened with any peril, she hides them in some deep thicket, offers herself to the danger, and allows herself to be chased in their stead.

The Fawns continue to follow the Buck and the Doe eight or nine months in all; and, upon separating, their horns begin to appear, as those of the stag, the first year, simple, and without antlers. These they shed at the latter end of autumn, and renew during the winter.

In the stag, the fallow-deer, and the Roebuck, there are two bony eminences, on which their horns grow, which begin to shoot at the end of five or six months, and which, in a little time longer, arrive at their full growth; and far from enlarging themselves as the animal advances in age, they diminish, and are even the most certain index for discovering, every year, the advanced age of all the species.

As the female goes only five months and a half with

young, and as the growth of the young Roebuck is quicker than that of the young stag, so his life is shorter, and does not appear to extend beyond twelve or fifteen years, at the farthest. The Roebucks remain in winter in the thickest coppices, and live on briars, broom, heath, &c. In spring, they repair to the more open groves, and browse upon the buds and young fresh leaves of almost every tree; and this warm food, fermenting in their stomachs, inebriates them in such a manner, that they are then easily surprised.

The Roebuck is the smallest of the British deer. The species is now nearly extinct in England. They are somewhat more plentiful in the highlands of Scotland.

It appears that this species, which is not so numerous as that of the stag, and which is very seldom to be found in many parts of Europe, is much more abundant in America. There we hear only of two sorts, the red, which is the larger, and the brown, which is the smaller; and, as they are more commonly found in the northern than in the southern parts of that continent, so it may be presumed, that they differ more from each other there than they do in Europe. In Louisiana, for instance, they are extremely common, and much larger than in France; they are also found at Brazil; for the animal which is there denominated the *Cujuacuapara*, differs not from the European Roebuck more than the Canadian stag differs from the French stag.*

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* It is surprising at this late day to find respectable works on natural history, retaining such a passage as this. The Roebuck is found in no part of America, nor is there any animal that could well be mistaken for it. The animal referred to is evidently the common fallow deer, or Virginia deer. We shall have occasion to notice this subject more fully, in a subsequent part of this work.

CHAP. X.

Of Wild Animals.....The Hare....The Alpine Hare....The Ogotona Hare....The Calling Hare....The American Hare ....The Little Chief Hare....and the Rabbit.

THE HARE.

Those species of animals which are the most numerous, are not always the most useful; but the species of the Hare, and of the rabbit, are advantageous to us, both as to their number and their utility. Hares are universally and abundantly spread over the face of the whole earth; and rabbits, though they originated only in particular climates, do yet multiply so prodigiously in almost every place to which they are transported, that it is no longer possible to extirpate them, and no small art is required in order to diminish their number. Some species of Hares are migratory. They move, in flocks of five or six hundred, and often to a great distance, in search of food.

In those districts in England, which are reserved for the chase, four or five hundred Hares are killed in the course of perhaps one day's sport. These animals multiply amazingly; they are in a condition to engender in all seasons, and before the first year of their life is expired. The females do not go above thirty or thirty-one days with their young. They produce three or four, and, as soon as these are brought forth, are again ready to receive the male; they likewise receive him while they are pregnant, and, by a particular formation of their genitals, are often found to have a superfœtation.

The young ones are brought forth with their eyes open; the mother suckles them for the space of twenty days; after which they separate themselves from her, and provide for their own subsistence; they do not withdraw themselves far from each other, nor from the place where they first drew breath; yet they live in solitude, and each composes for itself a form, at a little distance, perhaps sixty or eighty paces. Thus when we find a young Leveret in one place, we are almost sure of finding one or two more in the neighbourhood. They feed more by night than by day; and their favourite articles of provision are, herbs, roots, leaves, fruit, and grain; but above all, such plants as yield a milky juice. They even eat the bark of trees in winter. When they are reared at home, they are fed with lettuce and roots; but the flesh of these domestic Hares is always of a bad flavour.

Hares sleep much, but always with their eyes open. They have no eyelashes, and seem to have but bad eyes. The eyes, however, are so prominent, that they can see both before and behind. Their hearing is exceedingly acute, and their ears are very large compared with the size of their body. They move these long ears with great facility, and use them as a helm, in order to direct their course, which is so rapid, that they easily outstrip all other animals. As their fore legs are much shorter than their hind legs, they can more easily ascend than descend; for which reason, when they are pursued, their first object is to gain, if possible, some mountain. Their motion in running is a kind of gallop; they proceed without making any noise, because their feet are plentifully covered with hair, even underneath; and perhaps they are the only animals which have hair growing within their mouths.

Hares live not above seven or eight years. They pass their lives in solitude and in silence; and never are known to exert their voice, but when they are forcibly laid hold of, tormented, or wounded. They are by no means so wild as by their habits might be supposed: they are gentle, and susceptible of a species of improvement. As they have a good ear, as they rest on their hind feet of their own accord, and use their fore legs like arms, some have been so tutored as to beat a drum, to gesticulate in cadence, &c.

Hares may be domesticated, and they then display sagacity, affection, and no small share of curiosity. Cowper, the poet, has given an amusing account of three of them, which he kept for some years:—" I undertook," says he, " the care of three, which it is necessary that I should here distinguish by the names I gave them—Puss, Tiney, and Bess. Notwithstanding the two feminine appellatives, I must inform you that they were all males. Immediately commencing carpenter, I built them houses to sleep in, each had a separate apartment, so contrived that their ordure should pass through the bottom of it; an earthen pan placed under each received whatever fell, which being duly emptied and washed, they were thus kept perfectly sweet and clean. In the day time they had the range of a hall, and at night retired each to his own bed; never intruding into that of another.

" Puss grew presently familiar, would leap into my lap, raise himself upon his hinder feet, and bite the hair from my temples. He would suffer me to take him up in my arms, and has more than once fallen fast asleep upon my knee. He was ill three days, during which time I nursed him, kept him apart from his fellows, that they might not molest him (for, like many other wild animals, they persecute one of their own species that is sick), and by constant care, and trying him with a variety of herbs, restored him to perfect health. No creature could be more grateful than my patient after his recovery; a sentiment which he most significantly expressed by licking my hand, first the back of it, then the palm, then every finger separately, then between all the fingers, as if anxious to leave no part of it unsaluted; a ceremony which he never performed but once again upon a similar occasion. Finding him extremely tractable, I made it my custom to carry him always after breakfast into my garden, where he hid himself generally under the leaves of a cucumber vine, sleeping or chewing the cud until evening; in the leaves also of that vine he found a favourite repast. I had not long habituated him to this taste of liberty, before he began to be impatient for the return of the time when he might enjoy it. He would invite me to the garden by drumming upon my knee, and by a look of such expression as it was not possible to misinterpret. If this rhetoric did not immediately succeed, he would take the skirt of my coat between his teeth, and pull at it with all his force. Thus Puss might be said to be perfectly tamed, the shyness of his nature was done away, and, on the whole, it was visible by many symptoms which I have not room to enumerate, that he was more happy in human society than when shut up with his natural companions.

"Not so Tiney; upon him the kindest treatment had not the least effect. He too was sick, and in his sickness had an equal share of my attention, but if, after his recovery, I took the liberty to stroke him, he would grunt, strike with his fore feet, spring forward, and bite. He was, however, very entertaining in his way; even his surliness was matter of mirth, and in his play he preserved such an air of gravity, and performed his feats with such a solemnity of manner, that in him too I had an agreeable companion.

"Bess, who died soon after he was full grown, and whose death was occasioned by his being turned into his box, which had been washed, while it was yet damp, was a Hare of great humor and drollery. Puss was tamed by gentle usage; Tiney was not to be tamed at all; and Bess had a courage and confidence that made him tame from the beginning. I always admitted them into the parlour after supper, when, the carpet affording their feet a firm hold, they would frisk, and bound, and play a thousand gambols, in which Bess, being remarkably strong and fearless, was always superior to the rest, and proved himself the Vestris of the party. One evening the cat, being in the room, had the hardiness to pat Bess upon the cheek, an indignity which he resented by drumming upon her back with such violence, that the cat was happy to escape from under his paws and hide herself.

"I describe these animals as having each a character of his own. Such they were in fact, and their countenances were so expressive of that character, that, when I looked only on the face of either, I immediately knew which it was. It is said that a shepherd, however numerous his flock, soon becomes so familiar with their features, that he can, by that indication only, distinguish each from all the rest; and yet, to a common observer, the difference is hardly perceptible. I doubt not that the same discrimination in the cast of countenances would be discernible in Hares, and am persuaded that among a thousand of them no two could be found exactly similar; a circumstance little suspected by those who have not had opportunity to observe it. These creatures have a singular sagacity in discovering the minutest alteration that is made in the place to which they are accustomed, and instantly apply their nose to the examination of a new object. A small hole being burnt in the carpet, it was mended with a patch, and that patch in a moment underwent the strictest scrutiny. They seem to be very much directed by the smell in the choice of their favourites: to some persons, though they saw them daily, they could never be reconciled, and would even scream when they attempted to touch them; but a miller coming in engaged their affections at once; his powdered coat had charms that were irresistible. It is no wonder that my intimate acquaintance with these specimens of the kind has taught me to hold the sportsman's amusement in abhorrence; he little knows what amiable creatures he persecutes, of what gratitude they are capable, how cheerful they are in their spirits, what enjoyment they have of life, and that impressed as they seem with a peculiar dread or man, it is only because man gives them peculiar cause for it.

"Bess, I have said, died young; Tiney lived to be nine years old, and died at last, I have reason to think, of some hurt in his loins by a fall; Puss is still living, and has just completed his tenth year, discovering no signs of decay, nor even of age, except that he is grown more discreet and less frolicsome than he was. I cannot conclude without observing, that I have lately introduced a dog to his acquaintance; a spaniel that had never seen a Hare, to a Hare that had never seen a spaniel. I did it with great caution, but there was no real need of it. Puss discovered no token of fear, nor Marquis the least symptom of hostility. There is, therefore, it should seem, no natural antipathy between dog and Hare, but the pursuit of the one occasions the flight of the other, and the dog pursues because he is trained to it; they eat bread at the same time out of the same hand, and are in all respects sociable and friendly.

"I should not do complete justice to my subject, did I not add, that they have no ill scent belonging to them that they are indefatigably nice in keeping themselves clean, for which purpose nature has furnished them with a brush under each foot; and that they are never infested by any vermin."*

In general, the Hare is not devoid of the instinct necessary for its preservation, nor of sagacity sufficient to effect an escape from its enemies. It prepares for itself a form; and in winter, it chooses a spot which is exposed to the South, as in summer it does one which is situated to the north. It hides itself from view among hillocks of earth which are of the same colour as its hair. "I have seen," says Du Fouilloux, "a Hare so cunning, that, as soon as it heard the huntsman's horn, it started from its form, and, though at the distance of a quarter of a league from it, leaped to a pond, and there hid itself among the rushes, and thus escaped the pursuit of the dogs. I have seen a Hare, which, after having run above two hours before the dogs, has dislodged another Hare, and taken possession of its form. I have seen others swim over three ponds, of which the smallest was not less than eighty paces broad. I have seen others, which, after having been warmly chased for two hours, have entered a sheep-cot, through the little opening under the door, and remained among the cattle. I have seen others, which, when the dogs have chased them, joined a flock of sheep in the field, and, in like manner, remained with them. I have seen others, which, when they heard the dogs, have concealed themselves in the earth. I have seen others, which have gone along one side of a hedge, and returned by the other; so that there was only the thickness of the hedge between the dogs and the Hare. I have seen others, which, after they had been chased for half an hour, have mounted an old wall of six feet high, and taken refuse in a hole covered with ivy."

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* Puss died of old age, when she was within a month of her twelfth year.

The nature of the soil has a great influence on these, as well as on all other animals; the Hares of the mountains are larger and fatter than those of the plains, and are also of a different colour; the former being browner on the body, and whiter about the neck than the latter, which are more inclined to red. On high mountains, and in the northern countries, they become white in the winter, and in summer recover their ordinary colour.

THE ALPINE HARE

Is about nine inches in length, with a long head and whiskers, short rounded ears, and a fur which, at first sight, seems of a bright uniform bay colour, but which, in reality, is dusky at the roots, bright bay at the ends, slightly tipped with white, and intermixed with long dusky hairs. It never resides in a more southerly latitude than the Altaic chain of mountains, near the lake of Baikal, and is found as far to the north as Kamtschatka. As the depth of the winter snow would prevent them from finding food, these Hares, in companies, collect, towards autumn, vast heaps of their favourite herbs, which they dry carefully, and form into round or conoid ricks. These ricks are generally three or four feet in diameter, and sometimes of the height of a man. The horses of the Sable hunters would often perish of famine, did not these ricks afford a timely supply.

THE OGOTONA HARE

Is of a pale brown above, and somewhat white beneath. It is rather more than six inches in length, and has no tail. This species inhabits all Mongolia, and beyond the lake Baikal. It burrows in the sandy soil, or lives under heaps of stones, and forms its nest of soft grass. Like the Alpine Hare, it collects a winter store of provisions.

THE CALLING HARE

Is a solitary animal, a native of Russia, and is still smaller than the Ogotona Hare. It has a soft, long, smooth fur, of a brownish lead colour, the hairs tipped with black. This kind of Hare is easily tamed, and is very good natured. Its voice, which is like the piping of a quail, may be heard at a great distance, and is repeated three, four, and often six times successively, at equal intervals.

THE AMERICAN HARE, IMPROPERLY CALLED RABBIT.

The American Hare is found throughout this country to as far north as the vicinity of Carlton House, in the Hudson's Bay country. According to the statement of Hearne, "they are not plentiful in the eastern parts of the northern Indian country, not even in those parts that are situated among the woods; but to the westward, bordering on the southern Indian country, they are in some places pretty numerous, though by no means equal to what has been reported of them at York Fort, and some other settlements in the Bay." In parts of the Union, this Hare is exceedingly common, and large numbers are annually destroyed for the sake of their flesh and fur.

During the day time the Hare remains crouched within its form, which is a mere space, of the size of the animal, upon the surface of the ground, cleared of grass, and sheltered by some overarching plant; or else its habitation is in the hollowed trunk of a tree, or under a collection of stones, &c.

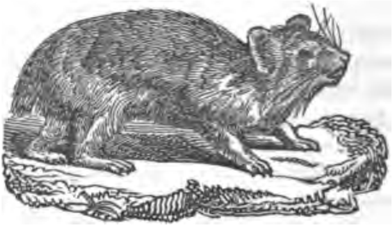
It is commonly at the earliest dawn, while the dewdrops still glitter on the herbage, or when the fresh verdure is concealed beneath a mantle of glistening frost, that the timorous Hare ventures forth in quest of food, or courses undisturbed over the plains. Occasionally during the day, in retired and little frequented parts of the country, an individual is seen to scud from the path, where it has been basking in the sun; but the best time for studying the habits of the animal is during moon-light nights, when the hare is to be seen sporting with companions in unconstrained gambols, frisking with delighted eagerness around its mate, or busily engaged in cropping its food. On such occasions the turnip and cabbage fields suffer severely, where these animals are numerous, though in general they are productive of serious injury. However, when the food is scarce, they do much mischief to the farmers, by destroying the bark on the young trees in the nurseries, and by cutting valuable plants.

The flesh of the American Hare, though of a dark colour, is much esteemed as an article of food. During the summer season they are lean and tough, and in many situations they are infested by a species of œtrus, which lays with eggs in their skins, producing worms of a considerable size. But in the autumnal season, and especially after the commencement of the frost, when the wild berries, &c. are ripe, they become very fat, and are a delicious article of food. In the north, during winter, they feed on the twigs of the pine and fir, and are fit for the table throughout the season. The Indians eat the contents of their stomachs, notwithstanding the food is such as we have just mentioned.

The American Hare never burrows in the ground like the common European rabbit. When confined in a yard, our animal has been known to attempt an escape by scratching a hole in the earth near the fence or wall; but there are few wild animals, whatever may be their characters, that will not do the same, under similar circumstances, though in their natural condition they may never attempt to burrow. Such is the fact in relation to the American hare, which never burrows while it is free tenant of the fields and woods. It has been said that this animal also occasionally ascends trees, which must be understood solely of its going up within the trunks of hollow trees, which it effects by pressing with its back and feet against opposite sides of the hollow, ascending somewhat in the same manner that a sweep climbs a chimney.

The Hare is not hunted in this country as in Europe, but is generally roused by a dog, and shot, or is caught in various traps and snares. In its movements our Hare closely resembles the common Hare of Europe, bounding along with great celerity, and would no doubt, when pursued, resort to the artifices of doubling, &c. so well known to be used by the European animal. The American Hare breeds several times during the year, and in the Southern States even during the winter months, having from two to four or six at a litter.

THE LITTLE CHIEF HARE.



THIS highly interesting animal inhabits the Rocky Mountains, from latitude 52° to 60°. Through the kindness of Mr. Macpherson, I obtained some specimens from the River of the Mountains, or south branch of the Mackenzie; and Mr. Drummond killed several near the source of the Elk River. There is likewise a good specimen in the museum of the Hudson's Bay Company.

Mr. Drummond informs me, that the Little Chief Hare frequents heaps of loose stones, through the interstices of which it makes its way with great facility. It is often seen at sunset, mounted on a stone, and calling to its mates by a peculiar shrill whistle. On the approach of a man, it utters a feeble cry, like the squeak of a rabbit when hurt, and instantly disappears, to reappear in a minute or two, at the distance of twenty or thirty yards, if the object of its apprehension remains stationary. On the least movement of the intruder, it instantly conceals itself again, repeating its cry of fear, which, when there are several of the animals in the same neighbourhood, is passed from one to the other. Mr. Drummond describes their cry as very deceptive, and as appearing to come from an animal at a great distance, whilst, in fact, the little creature is close at hand; and if seated on a gray limestone rock, its colour is so similar, that it can scarcely be discerned. These animals feed on vegetables. Mr. Drummond never found their burrows, and he thinks that they do not make any, but that they construct their nests amongst the stones. He does not know whether they store up hay for the winter or not, but is certain that they do not come abroad during that season.—*Richardson.*

THE POLAR HARE

Inhabits both sides of Baffin's Bay; it does not dig burrows, but shelters itself among stones and rocks. In winter its fur is snow white, and resembles down—in summer it is gray.

THE PRAIRIE HARE

Is found from the plains of the Missouri to Lake Winnepeg. Its fur is thick, and of a pure white, except along the neck, where it is gray.

THE RABBIT.

Though the hare and the Rabbit are externally, as well as internally, very much alike, yet they form two distinct and separate species.

The fecundity of the Rabbit is even greater than that of the hare; and, without crediting what Wotton has advanced, that one pair only, being left together in an island, produced six thousand in one year, it is certain, that these creatures multiply so prodigiously in countries which are proper for the breed, that the earth cannot furnish them with subsistence: they destroy herbs, roots, grain, fruit, and even trees and shrubs; and, were it not for the use made in Europe of the dog and the ferret, they would reduce the country to a desert. In the reign of Augustus, they became such a nuisance to the Balearic Islands, that the inhabitants were under the necessity of petitioning the emperor to send a military force to destroy them. The Rabbit not only engenders and produces oftener than the hare, but it has more ways to escape from its enemies, and to avoid the sight of man.

This circumstance alone may suffice to prove that the Rabbit is superior to the hare in point of sagacity. Both are alike in their conformation, and both have it in their power to dig retreats for themselves. Both are timid to an excess; but the one, possessed of less art, is contented with forming a residence on the surface of the earth, where it remains continually exposed; while the other, by a more improved instinct, takes the trouble to dig into the earth, and there to make itself an asylum; and so true is it, that they act in this case from a kind of reason or reflection, that we never see the domestic Rabbit employed in the same work. Rabbits give the alarm to each other by thumping on the ground with one of their hind feet, which may be heard to a considerable distance.

The domestic Rabbits, like all other animals, vary in their colour: white, black, and gray belong properly to Nature. The black Rabbits are the most scarce.

These animals are able to engender and produce at the age of five or six months. It is asserted, that they commonly attach themselves to one particular female, and never quit her. She goes with young thirty or thirty-one days, and will produce five, six, and sometimes seven or eight at a birth. Like the doe-hare, she has a double matrix, and of consequence can have in her womb at the same time, two separate litters. It appears, however, that superfœtations are less frequent in this species than in that of the hare.

A few days before they bring forth, they dig a fresh burrow, not in a right line, but in a crooked direction, at the bottom of which they make an excavation; after which they tear a quantity of hair from their bellies, and make a kind of bed for the use of their little ones. For the first two days they never quit them: they never stir abroad, unless forced to do so from necessity, and return as soon as ever they have taken their nourishment. At this season they eat much and very quick; and thus they tend and suckle their young for more than six weeks. Till then the Buck does not know them, nor does he enter the burrow which the Doe has dug. Often, even when she quits it and leaves her little ones behind, she stops up the entry to it with earth, wet with her urine; but when they begin to venture to the edge of the hole, and to eat groundsel and other herbs which the Doe picks out for them, the Buck begins to know them, to take them between his paws, to endeavour to give a gloss to their hair, to lick their eyes; and all of them, in succession, partake equally of his cares.

A gentleman, who had amused himself with raising Rabbits for many years, has communicated the following remarks:—

"I began," said he, "with only one male and one female. the former white, the latter gray; and of their produce, which was very numerous, the greatest part were gray, a good number of them white, and of a mixed colour, and some few black. These animals seem to have a great respect for paternal authority; at least I judge so, from the great deference which all my Rabbits showed for their first ancestor, whom I can always easily distinguish by his whiteness, and who is indeed the only male of that colour which I have preserved. It was to no purpose that the family augmented; those which, in their turn, became fathers, were still subordinate to him. Whenever they fought, whether on account of their females, or concerning their food, their great progenitor would run to the place of dispute with all speed, as soon as he heard the noise. No sooner did they perceive him, than every thing was presently reduced to order; and if he surprised any one of them actually assaulting another, he used to separate him from the rest, and punish him upon the spot. Another proof of his dominion over all his posterity, is, that they were accustomed to return at a whistle: whenever I gave the signal, how distant soever they might be, this old one immediately put himself at their head; and though he came first, yet he made them all file off, and enter before him; nor would he go in till the last."

Though rabbits are found in America, they are not natives of it, but are descended from those which have been brought from Europe. The animal vulgarly called Rabbit in this country, is the American hare, which we have described.

CHAP. XI.

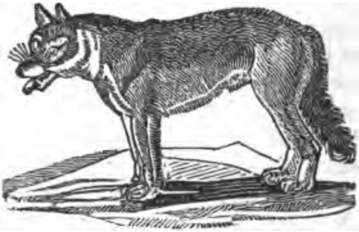
Of carnivorous Animals...The Wolf...The American Wolves...The American Foxes...The Badger...The American Badger...The Otter...The Sea Otter...The Mink...The Martin...The Pine Martin...The Pole Cat....The Skunk...The Ferret...The Weasel...The Ermine...The Sable.

ANIMALS which have but one stomach, and whose intestines are short, are forced, like man, to feed on flesh. Of this affinity, and of this truth, we shall receive certain information by a relative comparison of the size of the intestinal canal in carnivorous animals, and in those that live solely on herbage. We shall then find, that the difference in their manner of living depends solely on the difference in their conformation, and that their nourishment is more or less solid, as the receptacle for it is more or less capacious.

Hence, however, it is not to be concluded, that those animals which live solely on herbage are, from physical necessity, as carnivorous animals are with respect to flesh, absolutely confined to one kind of sustenance. It is only to be understood, that those which have several stomachs, or very large intestines, may be supported without this substantial aliment so necessary to others. It is not meant, that they might not use it, or that if Nature had furnished them with arms, not only for the purposes of self-defence, but for those of attack and rapine, they would not have exerted them, and soon accustomed themselves to flesh and blood; since we find, that sheep, calves, goats, and horses, greedily eat milk and eggs, which are animal food, and that, unaided by custom, they do not refuse meat which has been hashed and seasoned with salt.

Without a violation of truth, then, it may be said, that the generally predominant appetite of animals is for flesh and other solid food, and that this appetite is more or less vehement, more or less moderate, according to the particular conformation of each animal; since, on taking a full view of Nature, we find it not only in man, but in quadruped animals, in fishes, and in worms, for which indeed all flesh seems to be particularly and ultimately destined.

THE WOLF



Is one of those animals whose appetite for animal food is the most vehement, and whose means of satisfying this appetite are the most various. Nature has furnished him with strength, with cunning, with agility, with all those requisites, in a word, which fit an animal for pursuing, overtaking, and conquering its prey; and yet, with all these, the Wolf most frequently dies of hunger; for he is the declared enemy of man. Being long proscribed, and a reward offered for his head, he is obliged to fly from the habitations of man, and to live in the forest, where the few wild animals to be found, escape him either by their swiftness or their art, or are supplied in too small a proportion to satisfy his rapacity. When pressed with hunger, however, he braves danger, and comes to attack those animals which are under the protection of man, particularly such as he can readily carry away, lambs, sheep, or even dogs themselves; for all animal food becomes then equally agreeable. If this excursion has succeeded, he often returns to the charge, till having been wounded, or closely pursued by the dogs or the shepherds, he hides himself by day in the thickest coverts, and, for a while, only ventures out at night; but, at last, when his necessities are very urgent, he boldly faces certain destruction: he attacks women and children, and sometimes ventures even to fall upon men; becomes furious by his continual agitations, and ends life in madness.

The Wolf, as well externally as internally, so nearly resembles the dog, that he seems modelled upon the same plan; and yet he only offers the reverse of the image. If his form be similar, his nature is different; and indeed they are so unlike in their dispositions, that no two animals can have a more perfect antipathy to each other. A young dog shudders at the sight of a Wolf; a dog who is stronger, and who knows his strength, bristles up at the sight, testifies his animosity, attacks him with courage, endeavours to put him to flight, and does all in his power to rid himself of a presence that is hateful to him. They never meet without either flying from, or fighting with each other. If the Wolf is the stronger, he tears and devours his prey: the dog, on the contrary, is more generous and contents himself with his victory.

The dog, even in his savage state, is not cruel; he is easily tamed, and continues firmly attached to his master. The Wolf, when taken young, becomes tame, but never has an attachment.* Nature is stronger in him than education; he resumes, with age, his natural dispositions, and returns, as soon as he can, to the woods whence he was taken. Dogs, even of the dullest kinds, seek the company of other animals; they are naturally disposed to follow and accompany other creatures: the Wolf, on the contrary, is the enemy of all society; he does not even keep much company with those of his kind. When they are seen in packs together, it is not to be considered as a peaceful society, but a combination for war: they testify their hostile intentions by their loud howlings, and by their fierceness discover a project for attacking some great ani-

mal, such as a stag or a bull, or for destroying some formidable dog. The instant their military expedition is completed, their society is at an end; they then part, and each returns in silence to his solitary retreat. There is not even any strong attachment between the male and female; they seek each other only once a year, and remain but a few days together.

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* This, like most sweeping assertions, affirms too much. M. Frederick Cuvier gives a remarkable instance in which a Wolf manifested for his master all the devoted attachment of a dog. The gentleman who brought him up from a puppy, and who was going to travel, presented him to the Paris Menagerie when he was full grown. For several weeks the Wolf was inconsolable; but at length he contracted new attachments with those about him, and seemed to have fotgotten his former owner. At the end of eighteen months, however, that owner returned, and, as soon as the Wolf heard the well known voice in the gardens of the Menagerie, he displayed the most violent joy, and, on being set at liberty, he hastened to his friend. An absence of three years next took place, and the Wolf was again disconsolate. The master once more returned, and though, it being evening, the Wolf's den was shut up, yet the moment the tones of his friend met his ear, he uttered the most anxious cries. On the door being opened, he darted towards the long absent person, leaped upon his shoulders, licked his face, and threatened to bite the keepers when they attempted to separate them. When the man left him, he fell sick, rejected all food, was long on the verge of death, and would thenceforth never suffer a stranger to approach him. Ed.

The difference in the duration of the pregnancy of the she Wolf, who goes with young above a hundred days, and the bitch, who does not go above sixty, proves, that the Wolf and the dog, so different in disposition, are still more so in one of the principal functions of the animal economy.

The Wolf generally brings forth five or six, and sometimes even nine at a litter. The Cubs are brought forth, like those of the bitch, with the eyes closed. The dam suckles them for some weeks, and teaches them betimes to eat flesh, which she prepares for them, by chewing it first herself. They do not leave the den where they have been littered, till they are six weeks or two months old. It is not, however, till they are about ten or twelve months old, and till they have shed their first teeth and completed the new, that the dam thinks them in a capacity to shift for themselves. Then, when they have acquired arms from Nature, and have learned industry and courage from her example, she declines all future care of them, being again engaged in bringing up a new progeny. These animals require two or three years for their growth, and live to the age of fifteen or twenty.

The Wolf grows gray as he grows old, and his teeth wear, like those of most other animals, by using. He sleeps when his belly is full, or when he is fatigued, rather by day than night, and is always very easily waked. He drinks frequently; and in times of drought, when there is no

water to be found in the trunks of old trees, or in the pools about the forest, he comes often, in the day, down to brooks or lakes in the plain. Although very voracious, he yet supports hunger for a long time, and often lives four or five days without food, provided he is supplied with water.

The Wolf has great strength, particularly in his fore parts, in the muscles of his neck and jaws. He carries off a sheep in his mouth without letting it touch the ground. and runs with it much swifter than the shepherds who pursue him, so that nothing but the dogs can overtake him, or oblige him to quit his prey. He bites cruelly, and always with greater vehemence in proportion as he is less resisted; for he uses precautions with such animals as attempt to stand upon the defensive. He is cowardly, and never fights but when under a necessity of satisfying his hunger, or of making good his retreat. When he is wounded by a bullet, he is heard to cry out; and yet when surrounded by the peasants, and attacked with clubs, he never howls, but defends himself in silence, and dies as hard as he lived.

If he happens to be caught in a pit-fall, he is for some time so frightened and astonished, that he may be killed without offering to resist, or taken alive without much danger. At that instant, one may clap a collar round his neck, muzzle him, and drag him along, without his even giving the least signs of anger or resentment. At all other times, he has his senses in great perfection. He smells a carcass at the distance of more than a league; he also perceives living animals a great way off, and follows them a long time upon the scent. Whenever he leaves the wood, he always takes care to go out against the wind. When just come to its extremity, he stops to examine, by its smell, on all sides, the emanations that may come either

from his enemy or his prey, which he very nicely distinguishes. He prefers those animals which he himself kills to those he finds dead; and yet he does not disdain these, though ever so much infected, when no better is to be had. He is particularly fond of human flesh; and, perhaps, if he was sufficiently powerful, he would eat no other. Wolves have been seen following armies, and arriving in numbers upon the field of battle, where they devoured such dead bodies as were left upon the field, or but negligently interred. These, when once accustomed to human flesh, ever after seek particularly to attack mankind, choose to fall upon the shepherd rather than his flock, and devour women, carry off their children, &c. These dreadful Wolves are called *ware-wolves*, that is to say, Wolves of which we ought to be *aware*.*

The Wolf was early extirpated in England. Nothing is heard of them subsequently to the reign of Edward I. They stood their ground, however, much longer in Scotland and Ireland. The last Scotch Wolf is said to have fallen in Lochaber, late in the seventeenth century, by the hand of Sir Ewen Cameron. In Ireland they were not extirpated till the beginning of the eighteenth century.

The colour of this animal differs according to the different climates in which he is bred, and often changes even in the same country. Besides the common Wolves which are found in France and Germany, there are others with thicker hair, inclining to yellow. In the northern climates,

some are found quite black, and [illegible] white all over. The former are larger and stronger than those of any other kind.

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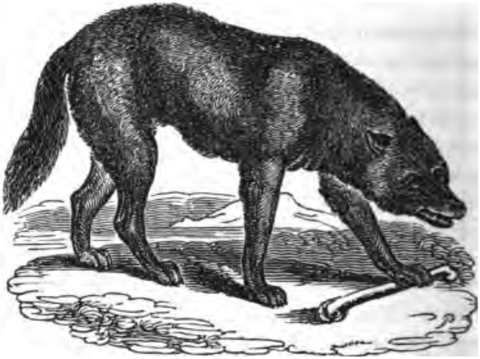
* This is a mistake. The word and the definition are both wrong; and the latter has the additional demerit of being absurd. There is no species of Wolf of which it is unnecessary to be aware. The word is derived from the Saxon. It is *were-wolf*, *i. e.* man-wolf, from a very ancient superstition that sorcerers sometimes changed themselves into Wolves. The Greeks also had their lycanthropos, or man-wolf. ED.

THE CLOUDED BLACK WOLF.*



This animal is a native of the extreme northern regions of America. It is a much nobler looking creature than the common species, and is also much larger and more robust. The ears are remarkably short, and the tail is shorter in proportion than that of the Wolf. The hair is mottled with various shades of black, gray, and white, and is of considerable length, particularly along the middle of the back and shoulders, where it forms a sort of ill-defined mane. On the sides the colouring is somewhat lighter, and is of a still lighter shade beneath. From the top of the nose to the origin of the tail, this animal measures about four feet and a quarter. Its ferocity remains undiminished by protracted confinement.

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* Two specimens of this animal are now in the Tower Menagerie of London; it is probably one of the varieties hereafter noticed.

THE WOLF.

When the aboriginal Americans first gave place to European adventurers, and the forests, which had flourished for ages undisturbed, began to fall before the unsparing axe, the vicinity of the settler's lonely cabin resounded with the nightly howling of Wolves, attracted by the refuse provision usually to be found there, or by a disposition to prey upon domestic animals. During winter, when food was most difficult to be procured, packs of these famished and ferocious creatures were ever at hand, to run down and destroy any domestic animal found wandering beyond the enclosures, which their individual or combined efforts could overcome, and the boldest house-dog could not venture far from the door of his master without incurring the risk of being killed and devoured. The common Wolf was then to be found in considerable numbers throughout a great extent, if not the whole of North America; at present it is only known as a resident of the remote wooded and mountainous districts, where man has not fixed his abode, nor laid bare the bosom of the earth to the enlivening radiance of the sun.

The common Wolf of America is considered to be the same species as the Wolf of Europe, and, in regard to habits and manners, gives every evidence of such an identity.*

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* Richardson remarks that he has travelled over 30 degrees of latitude in America, and has never seen there any Wolves which had the gaunt appearance, the comparatively long jaw and tapering nose, the high ears, long legs, slender loins, and narrow feet of the Pyrenean Wolf. He adds that the American animal has a more robust form than the European Wolf. Its muzzle is thicker and more obtuse, its head larger and rounder, and there is a sensible depression at the union of the nose and forehead. He notices six varieties of the Wolf in

Like all the wild animals of the dog kind, they unite in packs to hunt down animals which individually they could not master, and during their sexual season, engage in the most furious combats with each other for the possession of the females.

In the regions west of Hudson's Bay, Wolves are often seen, both in the woods and on the plains, though their numbers are inconsiderable, and it is not common to see more than three or four in a pack. They appear to be very fearful of the human race, but are destructive to the Indian dogs, and frequently succeed in killing such as are heavily laden, and unable to keep up with the rest. The males are not so swift as the females; and they seem to lead a forlorn life during the winter, being seldom seen in pairs until the commencement of spring. They bring forth their young in burrows, and though it might well be inferred that they are fiercer at those times, than under ordinary circumstances, yet Hearne states that he has frequently seen the Indians take the young ones from the dens and play with them. They never hurt the young Wolves, but always replace them in their dens, sometimes painting the faces of these whelps with vermilion or red ochre.

At the highest northern latitudes which have yet been explored, the Wolves are very numerous and very audacious. They are generally to be found at no great distance from the huts of the Esquimaux, and follow these people from place to place, being apparently very much

North America :—Common Gray Wolf, White, Pied, Dusky, Black, and Prairie.

There is little reason to doubt that all the Wolves of America are of one species; and the variations of size, color, and habits, are to be referred to diversities of climate which have been gradually impressed upon these animals.

dependent upon them for food, during the coldest season of the year. They are frequently seen in packs of twelve or more, prowling about at a short distance from the huts of the Esquimaux, lying in wait for the Esquimaux dog, which they are successful in killing if he wanders so far as to be out of reach of assistance from his master. In one instance, two of them rushed upon a fine Newfoundland dog belonging to Captain Lyon, in the day time, and would have killed him but for the timely interference of his master. Capt. Lyon relates the following singular instance of the cunning of one of these wolves which had been caught in a trap, and, after being to all appearance dead, was dragged on board the ship; 'The eyes, however, were observed to wink, whenever any object was placed near them; some precautions were therefore considered necessary, and the legs being tied, the animal was hoisted up with his head downwards. He then, to our surprise, made a vigorous spring at those near him, and afterwards repeatedly turned himself upwards, so as to reach the rope by which he was suspended, endeavouring to gnaw it asunder, and making angry snaps at the persons who prevented him. Several heavy blows were struck on the back of his neck and a bayonet was thrust through him, yet above a quarter of an hour elapsed before he died, having completely convinced us that for the future we should not too easily trust to the appearance of death in animals of this description.

Godman.

COMMON GRAY WOLF OF AMERICA.

THIS animal is very dissimilar in colour to the usual state of the European Wolf, and is of a much greater size. The teeth are remarkably strong and large; the ears sharp and erect, thickly clothed with dark brown hair, and tipped with gray.—*Richardson.*

PRAIRIE OR BARKING WOLF.

This Wolf frequents the prairies or natural meadows of the west, where troops or packs containing a considerable number of individuals are frequently seen following in the train of a herd of buffalo or deer, for the purpose of preying on such as may die from disease, or in consequence of wounds inflicted by the hunters. At night they also approach the encampment of travellers, whom they sometimes follow for the sake of the carcasses of animals which are relinquished, and, by their discordant howlings close to the tents, effectually banish sleep from those who are unaccustomed to their noise. According to Say's observation, they are more numerous than any of the other Wolves which are found in North America.

The barking Wolf closely resembles the domestic dog of the Indians in appearance, and is remarkably active and intelligent. Like the common Wolf, the individuals of this species frequently unite to run down deer, or a buffalo calf which has been separated from the herd, though it requires the fullest exercise of all their speed, sagacity and strength to succeed in this chase: They are very often

exposed to great distress from want of food, and in this state of famine are under the necessity of filling their stomachs with wild plums, or other fruits no less indigestible, in order to allay in some degree the inordinate sensations of hunger.

In confirmation of the sagacity of this Wolf we shall quote from Say, to whom we owe all that has yet been made known on this species, some anecdotes respecting it. "Mr Peale constructed and tried various kinds of traps to take them, one of which was of the description called a 'live trap,' a shallow box reversed and supported at one end by the well-known kind of trapsticks usually called the 'figure four,' which elevated the front of the trap upwards of three feet above its slab flooring; the trap was about six feet long, and nearly the same in breadth, and was plentifully baited with offal. Notwithstanding this arrangement a wolf actually burrowed under the flooring, and pulled down the bait through the crevices of the floor: tracks of different size were observed about the trap. This procedure would seem to be the result of a faculty beyond mere instinct.

"This trap proving useless, another was constructed in a different part of the country, formed like a large cage, through which the animals might enter but not return; this was equally unsuccessful; the Wolves attempted in vain to get at the bait, as they would not enter by the route prepared for them. A large double 'steel trap' was next tried; this was profusely baited, and the whole with the exception of the bait was carefully concealed beneath the fallen leaves. This was also unsuccessful. Tracks of the anticipated victims were next day observed to be impressed in numbers on the earth near the spot, but still the trap with its seductive charge remained untouched. The bait was then removed from the trap, and suspended over it

from the branch of a tree; several pieces of meat were also suspended in a similar manner from trees in the vicinity. The following morning the bait over the trap alone remained. Supposing that their exquisite sense of smell warned them of the position of the trap, it was removed and then covered with leaves, and the baits being disposed as before, the leaves to a considerable distance around were burned; and the trap remained perfectly concealed by ashes; still the bait over the trap was avoided. It was not until a log trap was used that an individual of this species was caught. This log trap is made by raising one log above another at one end by means of an upright stick, which rests upon a rounded horizontal trigger on the lower log."—*Godman.*

PIED WOLF.

WOLVES having black colours instead of gray, distributed in large patches on the side, are sometimes seen in the fur countries, associated with the common gray Wolf. On the banks of the Mackenzie I saw five young Wolves leaping and tumbling over each other, with all the playfulness of the puppies of the domestic dog, and it is not improbable that they were all of one litter. One of them was pied, another entirely black, and the rest showed the common gray colours.—*Richardson.*

THE DUSKY WOLF.

THIS Wolf is more robust in form, and fiercer and more formidable in appearance than either of those we have described. It is found in the Missouri country, frequenting the same districts as the prairie or barking Wolf, but is by no means in equal numbers. It is distinguished from the common Wolf by the length of its ears and tail, while it is separated from the barking Wolf by its greatly superior

size, difference of colour, &c. But little is known of the peculiar habits of this species, though there is no reason for believing that they differ much from those of its kindred species or varieties. It is remarkable for diffusing a strong and disagreeable odor.—*Godman.*

THE BLACK WOLF.

The Black Wolf has been found in the Missouri country, and the British possessions in North America, but not in such numbers as either of the foregoing species. It is not yet satisfactorily established that this Wolf is precisely of the same species as the European Black Wolf, whose scientific name is applied to it. Desmarest is much inclined to think it a new species, and it is most probable that a close comparison of the two will show differences between them, supporting his opinion.—*Godman.*

WHITE WOLF.

Wolves totally white are not uncommon in the most Northern parts of America, particularly in districts nearly destitute of wood. They are occasionally seen also on the plains of the Missouri.—*Richardson.*

THE FOX.

This animal has always been famous for his artifices; and the reputation he has thus acquired, he partly

merits. What the wolf cannot accomplish but by his superior strength, the Fox accomplishes by his superior cunning. Without attempting to oppose either the shepherd, his dog, or his flock, he finds an easier way to subsist. Patient and prudent, he waits the opportunity for depredation, and varies his conduct as he perceives that circumstances vary; and though as indefatigable as the wolf, and more nimble than that animal, he yet does not trust entirely to the swiftness of his course, but contrives for himself an asylum, to which he retires in cases of necessity, and in which, sheltered from danger, he brings up his young.

The Fox generally fixes his residence at the edge of a wood, and yet not far removed from some cottage or some hamlet. He listens to the crowing of the cock, and the cackling of other domestic fowls: even at a considerable distance he scents them, and seizes his opportunity. If he be able to get into the yard, he begins by levelling all the poultry without remorse. This done, he carries off a part of the spoil, hides it at some convenient distance, and again returns to the charge. Taking off another fowl in the same manner, he hides that also, though not in the same place; and this method he practises for several times together, till warned by the approach of day or the noise of the family, he finally retires. The same arts are observed when he finds birds entangled in springes laid for them by the fowler; with whom the Fox taking care to be beforehand, very expertly snatches the birds out of the snare, conceals them in different places, leaves them there sometimes for two or three days, and is never at a loss to recover his hidden treasure. He is equally alert in seizing the young hares and rabbits, before they have strength enough to escape him; and when the old ones are wounded and fatigued, he is sure to come upon

them in the moments of distress, and to show them no mercy. In the same manner he finds out the nests of the partridge and the quail, and seizes the mother while sitting.

The Fox is so voracious, that, when deficient of better food, he devours rats, mice, lizards, toads, and serpents. Insects and shell-fish he is likewise sometimes known to eat. In vain does the hedgehog roll itself up into a ball to oppose him: this determined glutton teases it till it is obliged to appear uncovered, and then devours it. The wasp and the wild bee are attacked by him with equal success. Though at first they fly out upon their invader, and actually oblige him to retire, yet this repulse is but for a few minutes, till he has rolled himself upon the ground, and thus crushed such as may have stuck to his skin: he then returns to the charge, and at length, by dint of perseverance, obliges them to abandon their combs, which he greedily devours, both wax and honey.

The young Foxes are born blind, like dogs; like them, too, they are eighteen months or two years in coming to perfection, and live about thirteen or fourteen years. They are nursed with great affection by the mother, who has been known to run with them in her mouth several miles when hunted. The senses of the Fox are as good as those of the wolf; his scent is more acute, and the organ of his voice is more supple and more perfect. The wolf is never heard but by dreadful howls, while the Fox only yelps, barks, and sends forth a mournful sound, resembling the cry of the peacock. His tones, too, are different, according to the different sentiments with which he is affected. He has one sound expressive of desire, another of murmur, another of sorrow, and another of pain: the latter is never heard from him, unless in the instant that he is wounded by a shot, and has lost the use of some member:

for, like the wolf when attacked with cudgels alone, he never murmurs, but will defend himself with obstinacy, and fight in silence to the last gasp. He bites dangerously, and with such determined fury, that, in order to make him relinquish his hold, ponderous wooden and even iron bars are necessary to be forced between his jaws.

The flesh of the Fox is not so bad as the flesh of the wolf. Dogs, and even men, eat it in autumn, especially if the animal has fed on grapes; and, in winter, good furs are made of his skin. He sleeps so sound, that, however closely approached, there is no great danger of awaking him. When he only means to rest himself, he stretches out his hind legs, and remains flat on his belly. In this posture he watches for the birds as they perch on the hedges; who no sooner perceive him than they give each other warning of their approaching danger. The jackdaw and the magpie, in particular, often follow him along to

the distance of some hundred paces, still towering beyond his reach, and with their cries, and notes of hostility, apprize other animals to beware.

Of all wild animals, the Fox is most subjected to the influence of climate; and there are found nearly as many varieties in this species, as in that of any domestic animal.

The generality of Foxes in Europe, are red; of some, however, the hair is of a grayish cast; and, of all, the tip of the tail is white. In the northern countries we find Foxes of all colours.

The preceding cut represents the common European Fox.

ARCTIC FOX.

The arctic Fox in its full winter dress is entirely of a pure white colour, except at the tip of the tail, where there are a few black hairs intermixed. Before the eyes and on the lower jaw, the hair is short and sleek; on the posterior part of the cheeks and on the forehead it becomes longer, and on the occiput and neck, it equals the ears in length, and is intermixed with soft wool. There is so much wool on the body, that it gives the fur the character of that of the American Hare. In the months of April and May, when the snow begins to disappear, the long white fur falls off, and is replaced by shorter hair, more or less coloured. The head and chin are then brown, having some fine white hairs scattered through the fur. A similar brown color extends along the back to the tail, and down the outside of all the legs; the under parts of the body being of a dingy white.

The perfect similarity of habits, and the series of variations in their fur, may lead us to conclude that the arctic Foxes of the New and Old World are of the same species. They are inhabitants of the most northern lands hitherto discovered, and in North America they are numerous on the

shores of Hudson's Bay, north of Churchill, and exist also in Bhering's Straits.

The brown variety of the Arctic Fox breeds on the sea coast, within the Arctic circle. They form burrows in sandy spots in little villages, twenty or thirty burrows being constructed adjoining each other. Towards the middle of winter they retire to the southward, evidently in search of food, keeping as much as possible on the coast.

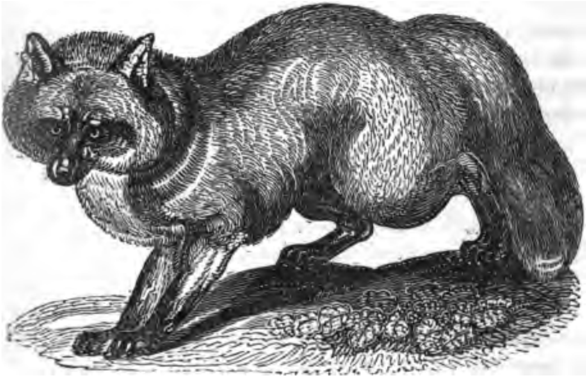
Captain Lyon, who has studied the manners of the Arctic Fox with attention, says," that it bears a great resemblance to the European species, though it is considerably smaller. The general time of rest is during the daylight, in which they appear listless and inactive, but the night no sooner sets in, than all their faculties are awakened: they commence their gambols, and continue in unceasing and rapid motion till morning. Their bark is so modulated, as to give you an idea that the animal is at a distance, although at the very moment he lies at your feet. They feed on eggs, young birds, blubber and carrion of any kind; but their principal food seems to be lemmings of different species. A confinement of a few hours often sufficed to quiet one of them; and some instances have occurred of their being perfectly tame although timid, from the first moment of their captivity. Their fur is of small value in commerce."

Richardson.

SOOTY FOX.

This is evidently a mere variety of the Arctic Fox, although Pennant considers it to be a distinct species. It has the form and stature of the Arctic Fox, and may be easily distinguished from the black or silver Fox by its round ears, and its very inferior fur. It is almost entirely of an uniform blackish brown colour. It inhabits the northern parts of America, and in its habits resembles the Arctic Fox.—*Richardson.*

THE AMERICAN FOX.*



THIS Fox is of a bright red colour on the head, back, and sides; on the throat and neck of a dark grey; and pale red on the under parts of the body. It bears a strong resemblance to the common European Fox, but differs from it in the breadth and capacity of its feet for running on the snow; and the quantity of long hair clothing the back part of the cheeks, with the shorter ears and nose, give the head a more compact appearance. It has a much finer brush than the European one, and is altogether a finer animal. It is very plentiful in the wooded district of the fur countries, about 8000 being annually imported into England from thence.

* This is the common Fox of America, and is frequently met with in all parts of the United States. Cuvier considers it a distinct species, but supposes the common red Fox of Europe to be also an inhabitant of America. Richardson says he did not meet with it, but imagines that it may be found in New Caledonia.

Red Foxes prey much on the smaller animals of the rat family, but they are fond of fish, and reject no kind of animal food that comes in their way. They hunt their food chiefly in the night, though they are frequently seen in the day time. They are taken in steel traps, but much nicety is required in setting them, as the animal is very suspicious.—*Richardson.*

AMERICAN CROSS FOX.

THIS Fox is considered by the Indians as a mere variety of the Red Fox; the gradations of color between characteristic specimens of the Cross and Red Fox, being so small, that the hunters are very often in doubt with respect to the proper denomination of a skin. The fur is of a grayish black, intermixed with white hairs, crossed with dark stripes. It is very valuable on account of its colour, which is preferred to that of the Red Fox.—*Richardson.*

THE GRAY FOX.*

THIS animal is said to be the most common species of Fox in the southern parts of the United States, and its skins are sometimes included amongst the Hudson Bay Company's importations from their most southern Canadian posts. It resembles the Cross Fox, though it is smaller in size.
Richardson.

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* The gray Fox is very common throughout this country. It is pursued by sportsmen with more pleasure than the red Fox, because it does not run for miles in one direction, but after various doublings, is generally killed near the place where it first started. The general colour of the animal is grisly; the inferior parts of the body are white. The tail is thick and bushy, of a pale yellow colour, and black at the end.—*Richardson.*

BLACK OR SILVER FOX.

This animal is very rare, a greater number than four or five being seldom taken in a season in the fur countries. The fur is six times the value of any other fur produced in North America. It is sometimes found of a shining black, the tip of the tail being white. It is commonly found of a black color, intermixed with hairs tipped with white. It inhabits the same districts with the red Fox. It is not yet clearly proved that it is of the same species as the black Fox of Europe, though it bears a strong resemblance to it.—*Richardson.*

KIT FOX.*

This species of Fox burrows in the open plains extend-

ing from the Saskatchewan to the Missouri, and also in th plains of the Columbia. These burrows are found at distance from the woody country, and the animal betake itself to them on the slightest alarm. It has long been known to the Hudson's Bay fur traders, its skins forming part of their annual exports, under the name of Kit Foxes. It is the smallest of the American Foxes.—*Richardson.*

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* This animal is known also by the name of the Swift Fox, from its extraordinary swiftness. It is said to outstrip the fleetest antelope or deer. It has also the name of the "burrowing Fox."

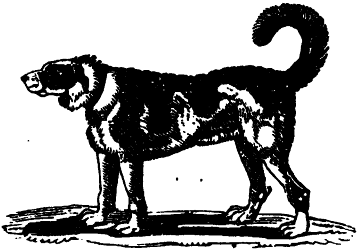
THE BADGER

Is a lazy, distrustful, solitary animal, that retires far from the approach of man, and digs a subterraneous residence, where it spends, at least, three-fourths of its existence, and never ventures forth but in search of food. It burrows in the ground with particular facility, as its body is rather of an oblong form, and its claws, those especially of the fore feet, are very long and compact. The hole which it thus forms often proceeds to a great depth below the surface of the earth, and the passage to it is always oblique and winding.

The Fox, who is less expert at such excavations, often appropriates to his own convenience the labours of the Badger.

Unable to compel him from his retreat by force, it drives him from it by stratagem, often remains a fixed sentinel at the mouth of the passage, disturbs it, and, as an infallible expedient, it is said, emits his ordure. The Badger gone, he immediately assumes possession of it, enlarges it, and about the belly. It is the swiftest of the Dog kind, and easily trained for the chase when twelve months old. It courses by sight and not by scent, as other hounds do; and is supposed to outlive all the Dog tribe. Buffon imagines it to be descended from the Irish Greyhound, only rendered more thin and delicate by the influence of climate. There is a variety of this species, which is called the **Highland Greyhound**. It is very large, strong, deep-chested, covered with long rough hair, and has the scent and sagacity of the bloodhound. This kind has become exceedingly scarce.

THE NEWFOUNDLAND DOG.



This animal, which came originally from the island whence it derives its name, has a remarkably pleasing countenance, is exceedingly docile, and of great size and sagacity. In their native country, they are extremely useful to the settlers on the coast, who employ them to bring wood from the interior. Three or four of them, yoked to a sledge, will draw three hundred weight of wood for several miles. In the performance of this task they are so expert as to need no driver. After having delivered their load, they will return to the woods with the empty sledge, and are then rewarded by being fed with dried fish.

their honey, where field-mice, lizards, serpents, and gras-hoppers are to be met with; and carries all to her expectin brood, which she frequently brings forward to the mout of her hole.

These animals are naturally of a chilly temperamen Such as are reared in a house seem to be never more hap-py than when near a fire. They are likewise very subjec to the mange; and, unless carefully washed, the dogs tha penetrate into their burrows are seized with the sam distemper.

The hair of the Badger is always filthy; between th anus and the tail there is an opening, which, though it ha no communication with any interior part, and is hardly a inch deep, continually emits an oily liquid. This th animal is fond of sucking. Its flesh, when the animal i well fed, makes excellent hams and bacon; and of its ski are made coarse furs, collars for dogs, and trappings fo horses. The hair is used for painters' brushes.

In America, hunting this animal forms a source of amuse-ment and emolument to the Indians of Bocca Montana, Albarregas, and most tribes that inhabit the higher regions of the Cordilleras, from Coro to Cumana. As there are no stated periods for taking it, although in the months of August, September, and October, it is certainly fattest, they continue to search for it the whole year round, unless during the breeding season, when the flesh is lank and lean, and the lard, or butter, *(manteca)*, rancid. In making their hunting dispositions, they form parties of seven or eight, or more. When the tribe is numerous, they will sometimes take five, six, or seven miles in a sweep over the country; and such is their dexterity and address in taking these animals, that they will nearly clear it for five or six years of Badgers, notwithstanding all the obstruction of brushwood, cover, &c. &c. In these excursions they are ccompanied by a number of women and boys, whose buiness it is to build temporary huts, cook, collect fruits, nd, lastly, to cure what Badger hams and gammons the men catch: this is no sinecure, and although they rest duing the night, the day ushers them in more labour than omes to the hunters' share. When they arrive at the Badgers' haunts,—generally in high situations, contiguous o rocks, for the purpose of burrowing when hard pressed,—hey soon discover his traces by the manner in which he scrapes for pistachios and other nuts. They then search the rock until they find the burrow, and also under the projecting roots of large trees, the hollows of which afford them shelter. When the burrows are in trees, they seldom give themselves the trouble of erecting pitfalls for them, as their curs kill and drag them out, or else they dig them out. When the burrows are in the rocks, they set to work to erect pitfalls or traps, in the building of which they display a regularity and system that would do credit to a European mason. As the falls are four feet by four in height and breadth, the flags with which they are built are so closely set, as to prevent the creature introducing his paw-nails between them; for his strength is such that he would raise a stone of two or three hundred weight. As the Badger's family generally consists of seven or eight, the hunters set as many pitfalls in their way as will intercept them, one by one, in making their passage to their burrows; and frequently one in the mouth of the burrow, provided it is large enough, covering them with turf, earth, and leaves over little twigs. As soon as they have made a sufficient number, with incredible labour and perseverance, using no other implements than their hatchets and stone-hammers, the covering-flag is placed over; at the back of this they place a quantity of rubbish, so as to give weight to its fall, and plant bushes so artfully as to deceive a stranger, forming a lane, through which the creature must necessarily pass to his burrow. Then one or two ascend the trees or highest rock, to give notice of the Badger's approach; while another is buried in sight of the traps in such a manner as to be covered with leaves, and in such a posture as to observe the creatures coming toward the traps, and hurry them into them by missiles, but never attempts to show himself until the Badger passes him. In this manner the remainder of the party advance into the brushwood, and then let loose their dogs, who, on scenting the Badgers, sets up a whining cry, accompanied by the rattles of the Indians, making the Badger start and betake himself to his burrow. Sometimes seven or eight will start together, the most of which are always caught; but should one escape, they again hunt the ground over. If their party is not numerous enough, the women join after the first chase, as the danger of coming in contact with tigers is over, the first noise having started these as well as most noxious creatures. Indeed, the Badger is seldom found near the jungle, as he is not fond of such neighbours. Should one escape the traps, which is very seldom the case they leave the traps set day and night, and a man to watch him, until hunger forces him to quit his subterraneous abode. Sometimes the Indian curs will enter, and kill the creature, if his burrow is large enough to admit them; yet he often makes them retreat, provided they cannot surround him, although those curs are certainly superior to our European terriers in bite, and tenacity of their hold. Whenever a Badger earths, the Indians cast lots, to know which shall watch until the Badger breaks, leaving him two days' provisions in the mean time, supposing this to be the usual time until the animal bolts. But it is sometimes a toss up which will hold out longest, especially if it be an old Badger: but even here the Indian has decidedly the advantage, as he is known to endure four days' hunger, without any bad results. If it happens in harvest, he is pretty well off; for his cunning makes him an overmatch for the animal, and he always carries the image of a man of rude workmanship, which he sets before the earth, supported by twigs in a moving position: this prevents the Badger stirring while the Indian goes in quest of food, a work of little time with him, as he is satisfied with the first thing he finds. He soon returns to await the coming out of his subterraneous visiter, as the disgrace of returning without the Badger is shocking to a hunter, and debars his ever being a *guapo*, or warrior, until he can, by some very extraordinary feat, wipe this stain off his name. They also use the noose or snare to catch these creatnres, which is placed across the pathways, like rabbit-wires, with this exception, that the Indian snare is attached to a spring pole, that suspends and strangles the creature. The South American Badger is larger than those in Europe, and much browner: he is also much easier killed.

Perhaps its habits are the most social of any quadruped in the universe; it is not known to quarrel with any other quadruped; even the fox, polecat, stinkard, the oppossum, the land crab and snake, make it resign its abode, although it is much stronger than any of them. It also lives in the greatest harmony with its own species, subsisting principally on nuts, roots, and vegetables; and is cleanly in its habits, being observed to perform its ablution while the dew is on the ground. The Indians count two species of it, *viz.* the Marona, or pig-badger; and the Pero, or dog-badger. I am informed the former roots for its amusement like a pig; they bring forth two, three, and four at a litter, and preserve them carefully. Badger hams are certainly delicious, and the sale of them was prohibited but to the

THE MARTIN.

The generality of naturalists have considered the Martin and the Pine Martin as animals of one and the same species. They are, however, different both in disposition and temperament. The Pine Martin shuns open countries, confines itself to the bosom of the forest, fixes its residence upon some tree, and is never found in great numbers but in cold climates; while the Martin not only approaches human habitations, but even forms a residence for itself in old buildings, in haylofts, in holes of walls, and the species is generally diffused in great numbers over all the temperate climates.

The countenance of the Martin is very sharp; its head is small and elegantly formed; its eye is lively; its limbs are supple; its body is astonishingly flexible; and all its movements are quick. The back, sides, and tail of the Martin are covered with a fine downy fur, with longer hair intermixed; the roots of an ash colour, the middle of a bright chesnut, and the points black. The head is brown, with a slight cast of red; the legs and feet are of a chocolate colour, and the throat and breast are white. It rather leaps and bounds than walks; and with great facility climbs walls, enters pigeon-houses and hen-houses, devours the eggs, the pigeons, and the hens, as on other occasions it does mice, rats, moles, and birds in their nests.

THE NORTH AMERICAN BADGER.

THE American Badger, as compared with the European, s generally less in size, and of a lighter make; the head, hough equally long, is not so sharp towards the nose, and he markings on the fur are remarkably different. A narrow white line runs from between the eyes towards the back, the rest of the upper part of the head is brown, the throat and whole under jaw are white, the cheeks partly so; a semicircular brown spot is placed between the light part of the cheeks, and the ears.

The American Badger frequents the sandy plains or prairies, which skirt the Rocky Mountains, as far north as latitude 58°. It abounds on the plains watered by the Missouri, but its exact southern range has not, as far as I know, been defined by any traveller. The sand prairies, in the neighborhood of Carlton-house, on the banks of the Saskatchewan, and also on the Red River, that flows into Lake Winnipeg, are perforated by innumerable Badger-holes, which are a great annoyance to horseman, particularly when the ground is covered with snow.

Whilst the ground is covered with snow, the Badger rarely comes from its hole; and I suppose that in that climate it passes the winter from the beginning of November to April, in a torpid state. Indeed, as it obtains the small animals on which it feeds by surprising them in their burrows, it has little chance of digging them out at a time when the ground is frozen into a solid rock. Like the bears, the Badgers do not lose much flesh during their long hibernation; for on coming abroad in the spring, they are observed to be very fat. As they pair, however, at that season, they soon become lean.

This Badger is a slow and timid animal, taking to the first earth it comes to, when pursued; and as it makes its

way through the sandy soil with the rapidity of a mole, it soon places itself out of the reach of danger. The strength of its fore feet and claws is so great, that one which had insinuated only its head and shoulders into a hole, resisted the utmost efforts of two stout young men, who endeavored to drag it out by the hind legs and tail, until one of them fired the contents of his fowling piece into his body. Early in the spring, however, when they first begin to stir abroad, they may be easily caught by pouring water into their holes; for the ground being frozen at that period, the water does not escape through the sand, but soon fills the hole, and its tenant is obliged to come out.

The American Badger appears to be a more carnivorous animal than the European one. A female which I killed had a small marmot, nearly entire, together with some field mice, in its stomach. It had also been eating some vegetable matters.—*Richardson.*

THE WOLVERENE.

THIS animal has a broad compact head, which is suddenly rounded off on every side, to form the nose. In the shape of its jaws it resembles a dog. Its ears are low, rounded, and much hid by the surrounding fur. The back is arched, the tail low and bushy; the legs thick and short; and the whole aspect of the animal indicates strength without much activity. The fur bears a great similarity to that of the black bear, but is not so long, nor of so much value.

The Wolverene is a carnivorous animal, which feeds chiefly upon the carcasses of beasts that have been killed by accident. It has great strength, and annoys the natives by destroying their hoards of provision, and demolishing their marten traps. It is so suspicious, that it will rarely enter a trap itself, but beginning behind, pulls it to ieces, scatters the logs of which it is built, and then car-ies off the bait. It feeds also on meadow mice, marmots, nd other *redentia*, and occasionally on disabled quadru-eds of a larger size. I have seen one chasing an American hare, which was at the same time harassed by a snowy owl. It resembles the bear in its gait, and is not fleet; but it is very industrious, and no doubt feeds well, as it is generally fat. It is much abroad in the winter, and the track of its journey in a single night may be traced for many miles.—*Richardson.*

THE OTTER.

Of the Otter tribe there are eight species known, of which, however, it will be necessary for us to describe only two. Otters have six sharpish cutting teeth in each jaw, the lower of which do not range in a line with the rest, two of them being placed somewhat within the others. The canine teeth are also longer than the others. Webbed feet are common to all the varieties of this tribe, which are likewise characterized by very long bodies and short legs.

The Common Otter is of a deep brown colour, and is usually about two feet in length from the tip of the nose to the insertion of the tail; the head and nose are broad and flat; the mouth bears some similitude to that of a fish; the neck is short, and equal in thickness to the head; the body long: the tail broad at the insertion, but tapering off to a point, and about sixteen inches long; the eyes are very small, and placed nearer to the nose than is customary in quadrupeds. The legs are very short, but remarkably strong, broad, and muscular, and so placed as to be capable of being brought into a line with the body, and performing the office of fins; and each foot is furnished with five toes, connected by strong broad webs, like those of waterfowl.

Accurately considered, the Otter cannot be pronounced an amphibious animal. We even find them drowned when they happen to have been entangled in a net; and this evidently for want of having had time to destroy it, and thereby effect their escape. For want of fish, frogs, water-rats, or other nourishment, it will eat the young branches, and the bark of aquatic trees; and in spring it will eat new grass.

These voracious animals are generally found at the sides of lakes and rivers, but particularly the former, in which they destroy so much more than they devour, that they will sometimes spoil a pond in the space of a few nights. They do equal mischief by tearing in pieces the fishermen's nets, which they infallibly do, whenever they happen to get entangled in them. In forming its retreat the Otter displays great sagacity. It makes the entrance under water, burrows upwards, provides several cells to retire to in case of floods, and opens on the surface a small orifice for the admission of air, which orifice it contrives so as to be concealed by a thick bush. The female goes with young about nine weeks, and generally produces four or five at a time. These are always found at the edge of the water; and, if under the protection of the dam, she teaches them, on the approach of an enemy, to plunge, like herself, into the deep, and escape among the weeds or rushes that fringe the stream. It is, therefore, only in the absence of the dam, that the young can be taken; and in some places there are dogs purposely trained for discovering their retreats. One of the favourite pastimes of the Otter is, to get on a high ridge of snow, bend their fore feet backward, and slide down the side of it, sometimes to the distance of more than twenty yards.

If taken while young, the Otter may be tamed and taught to fish for its master, and will become almost as affectionate and docile as the dog.

For the destruction which he makes among the finny tribe, and also the disturbance which he gives them in their haunts, the Otter is an object of abhorrence to the angler. Old Izaak Walton calls them "villanous vermin," and many other hard names, and declares that, in his judgment, "all men that keep Otter-dogs ought to have pensions from the king, to encourage them to destroy the breed of these base Otters."

Unless it can be shot, it is difficult to capture the Otter, when the water is not frozen, as it takes to the water, dives, and only occasionally "vents," as the hunter terms it; that is, raises its nose to the surface to breathe. "The old hunters (says a recent writer), who set more value upon the difficulty of the capture, than on the prey itself, attack the Otter *in posse comitatus*, beat the banks with dogs, hedge in a space with nets, and assail the Otter with clubs and spears, when he comes up to breathe." This was precisely the manner in which an Otter hunt was conducted in the days of honest Izaak, and he seems to have considered it as the finest of all sports, except angling.

In South America, hunting the Otter forms a recreation for the grandees or better sort of gentry for two or three months in the year, like European grousing or partridge

shooting parties. The sport is thus described by a recent traveller:—In the month of May, the parties assemble by previous arrangement, composed principally of the chief inhabitants of these districts and their relatives or clans, and visiters, male slaves, muleteers, &c. Having ascended the waterfalls, they encamp near those clear and transparent rivers in which Otters abound in great numbers. After the business of physicking the bloodhounds and a species of blueish cur without any hair, they make their hunting dispositions, and appoint their land and water captains to head each party; the duty of the latter is to stand in the prow of the canoe, and cheer the dogs to the prey. A huntsman, in fact, is mostly an Indian, as those dogs will not hunt to any other tongue; what this is owing to, whether custom or sagacity, I know not, but it is certainly the case; however, the young Spaniards and Creoles have latterly remedied this defect, and are now as well qualified to hunt a bloodhound in the Indian tongue as an Indian himself. Both parties having armed themselves with Otter spears, barbed like harpoons, and with long handles made of rough light wood about ten feet or more, they cheer on the bloodhounds, who no sooner wind the prey than they join chorus with their huntsman, until they arrive near the Calle Pero, or Otter city, when the land party divide into three; one watches; another ascends the ford; while the others poke the banks, in order to eject the creature. As soon as he is started, the hounds are again in full cry, and the curs are loosed to dive after him, and will relieve each other in this task: as soon as one is up, down goes the other, while the hounds keep up the cry in the water at a slow pace, until they eventually force the creature to the head of the stream into shallow water, where these curs either snap him up, or he is speared by the hunters; after this the hounds are allowed the gratification

of mouthing him until satisfied, when they again return to depopulate this little commonwealth of Otters.

After all the old Otters have fled, the young ones betake themselves to the uppermost recesses of their burrows, and defend themselves with great obstinacy when they are dug out of their habitation; a slight blow on their forehead will soon despatch them, as that seems their most vulnerable part. In their abode the heads, tails, fins, and fragments of several species of fish are to be seen; for the Otter is, like most aquatic monsters, a glutton. As he seldom eats more than a mouthful of each fish, he must cause frightful destruction among the finny race, and his depredation causes his haunts to be found out at low water, when the hounds would otherwise pass him.

Abbé Ricardo, who wrote a little treatise on the history of this animal, about a century ago (which is still in good preservation in the cathedral of Caracas) relates, that while the parent Otters are in existence, they do not suffer the young gentry to attempt propagating the species, but that the young are two or three years under their parents' guardianship. One thing is very certain,—in the same community are to be met three or four different generations of those creatures under the guidance of their patriarch. The alligator is the only aquatic enemy of this creature, with the exception of the shark, with whom he has very little intercourse. It seems Father Ricardo caused a cage pond to be erected in his garden, in order to study their natural history. His little work teems with amusing anecdotes of the aboriginal hunters, of whose club he was a member; those gentry, he said, during such excursions, lived well. Certainly, the echoing cry of hounds and hunters is the most delightful I ever heard. It vibrates through every glen at the distance of five or six miles.

The colour of the South American Otter is different

from that of the European: the latter is much darker; and the male is still darker than the female, who generally gets brown while suckling her puppies; Abbé Ricardo says that they change coats. The skin is now more valuable than formerly, as General Parr's cavalry use them for pistol covers, and foraging regimental caps are made of them. They also use their skins for segar cases, and the Indians eat their flesh. In destroying fish, the Otter rejects the head, and will not use it, although pressed by hunger. In Buenos Ayres there is one quite domesticated, which will invariably bring home what it gets in the river: but tame habits make it lazy and indolent; it is vicious during the breeding season, and is obliged to be chained.

CANADA OTTER.*

Mr. Frederick Cuvier not only separates the Otter of Canada from that of South America, but also describes a distinct species inhabiting an intermediate district.

The Canada Otter resembles the European species in its habits and food, but it may be distinguished from it, by the fur of its belly being of the same shining brown as its back. It is a much larger animal, and has, in proportion, a shorter tail than the European one. In the winter season it frequents rapids and falls, to have the advantage of open water, and when its usual haunts are frozen over, it will travel to a great distance, through the snow, in search of a rapid which has resisted the severity of the weather. If it is seen, it throws itself on its belly, and slides through the snow for several yards, leaving a deep furrow behind it. This movement is made with great rapidity. When closely pressed, it will turn and defend itself with great obstinacy. It inhabits the Mackenzie and other rivers nearly to the Arctic Sea.

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* The Otter inhabits South as well as North America.—In the southern, middle and eastern states they are scarce; but in the western states, they are found in considerable numbers.—*Godman.*

Richardson.

THE SEA OTTER.

This harmless, playful, and interesting animal is generally about four feet long, thirteen inches of which are occupied by the tail. The fur is of great value, it being soft and of a deep glossy black. It has long been exported in great quantities by the Russians, who received eighty or a hundred rubles from the Chinese for each skin until the market was overstocked. The Sea Otter is to be found only within a very few degrees of latitude in the North Pacific; its range being mostly confined to the coast of Kamtschatka,the adjoining islands, and the opposite American shore. Sea Otters are perfectly inoffensive, and so sportive that much of their time seems to be passed in playing diverting tricks. They live in pairs, and are very constant to each other. Such is their fondness for their young, that they will never abandon them; on being robbed of them, they will starve themselves to death, and will endeavour to breathe their last on the spot where their offspring were destroyed.

THE MINK, OR VISON WEASEL.

This animal is found throughout a great extent of country from Carolina to Hudson's Bay, and in its habits and appearance resembles the otter. The favourite haunts of this species are the banks of streams, where it inhabits holes near the water. It is an excellent swimmer and diver, and feeds on frogs and fish. It also commits great depredations in the poultry-yard. When provoked, it ejects a fetid liquor, which is exceedingly unpleasant.

Godman.

the hollow part of some old tree, and to these has recourse for provision in winter; and such is the agility of its body, that it will, in an instant, climb a beech tree, let its bark be ever so smooth.

There are many species which approach to that of the Squirrel, though there are few varieties in the species itself. Some there are of an ash colour, and all the others are red. The small gray Squirrel is of a different species, and remains always gray: and, without mentioning the flying Squirrels, which are very different from the others; the white Squirrel of Cambaye, which is very small, and has a tail like that of the European Squirrel; that of Madagascar, called *Tsitsihi*, which is gray, and which, as Flacourt says, is neither handsome nor fit to be tamed; the white Squirrel of Siam; the gray, and spotted Squirrel of Bengal; the streaked Squirrel of America; the black Squirrel; the gray Virginian Squirrel; the white-striped Squirrel of New Spain; the white Siberian Squirrel; the variegated Squirrel; the little Squirrel of Brazil; that of Barbary; the *palmist*, &c. form so many species entirely distinct and separate from that of which we have been treating.

THE LONG-TAILED SQUIRREL

Is about three times the size of the common Squirrel. It is of a blackish colour, and is a native of Ceylon and Malabar.

THE PALM SQUIRREL.

The Palm Squirrel is a native of the southeastern part of Asia and the neighbouring islands, and is about the size of a rat. It lives upon palm trees. It is a familiar creature, and will enter houses, and pick up crumbs that drop from the table. Its back is variegated with stripes.

GRAY SQUIRREL OF EUROPE.

This animal is nearly the size of the American gray Squirrel. It migrates to immense distances. It crosses rivers on a piece of pine bark, and uses its tail as a sail. It makes its nest in hollow trees; and lays up stores of provisions for winter use, in holes made in the ground.

SQUIRREL OF BARBARY AND SWITZERLAND.

The Squirrel of Barbary resembles the palm Squirrel, but there is still reason to believe them separate animals. The Swiss Squirrel lives in the earth, and forms a retreat that water cannot penetrate. It bites unmercifully, and is more like a rat than a Squirrel in his nature.

SQUIRRELS OF AMERICA.

We have selected from Godman and Richardson, the following species of American Squirrels, with a few of the localities and peculiarities of each.

The **fox Squirrel** is found throughout the southern States, where it frequents the pine forests in considerable numbers, and derives its principal subsistence from the seed of the pine. The nest is placed in the top of a high pi stroy the serpents with which that island was infested; their scent, which in the dog is an eminent quality, is far from being good, and therefore they do not pursue animals which they no longer see; they do not hunt, but wait and attack them by surprise.

The most immediate physical cause of this inclination, which they have to spy out, and surprise other animals, comes from the advantage which they receive from the particular conformation of their eyes. The pupil, in man, as well as in the greater part of animals, is capable of a certain degree of contraction and dilatation; it enlarges a little when there is no light, and contracts when it becomes too strong.

In the eye of the Cat, and of nocturnal birds, this contraction and dilatation are so considerable, that the pupil, which in obscurity is large and round, becomes, in broad day, long and narrow like a line; and for this reason these animals see better during the night than during the day, the form of the pupil being always round when it is not constrained. During the day, there is a continual contraction in the eyes of the Cat, and it is only by effort, as it were, that he sees in a strong light; whereas at twilight, the pupil resuming its natural form, he sees perfectly, and profits from this advantage to know, attack, and surprise other animals. The whiskers, too, appear to aid him in the chase, by possessing qualities analogous to those of the antennæ of insects.

Cats seem to have a natural dread of water, cold, and bad smells. They are very fond of perfumes, and gladly suffer themselves to be taken and caressed by persons who use them. The scent of valerian has so powerful and so delicious an effect on them, that they appear transported with pleasure by it; and in order to preserve this plant in gardens, it is common to surround it with a close fence.

The COMMON GRAY SQUIRREL is remarkable for its beauty and activity, and is common throughout the United States. It is generally found in hickory and chesnut woods, where it feeds on nuts, and lays up a hoard for the winter. They construct their nests with care on the tops of tall trees, and seldom leave them during the cold weather. They do a great deal of mischief in the corn fields, by destroying and carrying off a great quantity of corn. They are very easily domesticated, and in captivity are very playful and mischievous. The gray Squirrel is commonly of a fine bluish gray, mingled with a golden colour.

The GREAT TAILED SQUIRREL, so called from the length of its tail, is common on the Missouri. It is of a grayish black colour, and is very graceful and active.

The LINE TAIL SQUIRREL inhabits the Missouri country, where it builds its nest in the holes and crevices of rocks. It is fond of the naked cliffs, where there are but few bushes, and very rarely ascends a tree. It feeds on buds, leaves, and fruits of plants. It is of an ash colour intermixed with white hairs. Its fur is coarse, and the tail which is very long, is marked with three black lines on each side.

The FOUR LINED SQUIRREL is found on the Rocky Mountains. Its nest is composed of a great quantity of the branches of different kinds of trees, and with other vegetable productions. It does not ascend trees by choice. This Squirrel is marked, on the head and back, with white lines. It is exceedingly active and industrious.

The COLUMBIAN PINE SQUIRREL was seen by Lewis and Clark on the banks of the Columbian river, but is supposed by Richardson to be a variety of the Hudson's Bay Squirrel; its habits being similar.

a whole warren. They will also catch and eat fish, though, probably, this is done by them only when other food is not attainable. This animal is not a native of America.

THE SKUNK.

This animal inhabits the whole of North America, and is also found throughout a part of the southern portion of that continent. A considerable number of animals of this genus are natives of America, resembling each other strongly in form and size, but differing in the number and variety of their stripes and markings, have been described by authors as so many distinct species. Baron Cuvier thinks that the present state of our knowledge of these animals does not warrant us in considering them otherwise than as varieties of a single species, and of these varieties he enumerates fifteen.

This animal is of a brown colour, marked sometimes with two white stripes. The faculty this animal possesses, of annoying its enemies by the discharge of a noisome fluid, causes it to be rather shunned than hunted, which the value of its skin would otherwise be sure to occasion. The smallest drop of this fluid is sufficient to render a garment detestable for a great length of time. Washing, smoking, baking or burying articles of dress, seems to be equally inefficient for its removal.

The Skunk is generally found in the forests, having its den either in the stump of an old tree, or in an excavation in the ground. It feeds on the young of birds, and upon small quadrupeds, eggs, wild fruits, &c. It also does much mischief in the poultry-yard.

THE FERRET.

It has been doubted by some authors, whether or not the Ferret and the polecat were animals of two different species. Perhaps, the resemblance there sometimes is in the colour of their hair first gave rise to this uncertainty. The polecat, nevertheless, a native of temperate climates, is an animal wild like the martin; whereas the Ferret, originally an inhabitant of Africa, can only exist in Europe as a domestic animal. The Ferret also, and not the polecat, is made choice of to drive the rabbits from their burrows, chiefly because it is more easily tamed. The Ferret has a longer and thinner body, a narrower head and a sharper snout, than the polecat. It has not the same sagacity in providing for its subsistence; it cannot exist, at least in England or France, without the care of man, nor have such of the species as have been lost in the burrows of rabbits, been ever known to multiply in the country; but have, on the contrary, perished, to all appearance, by the severity of the winter.

This animal is by nature a mortal enemy to the rabbit. If even a dead one is presented to a young Ferret which had never seen one before, it springs at it, and tears it with fury; if it be a living one, it seizes it by the neck and nose, and instantly begins to suck its blood. When the Ferret is let loose into the burrows of the rabbits, it is necessary to muzzle him, that he may not kill them at the bottom, but only oblige them to run out, and thereby fall into the net laid for them at the entry. If he is allowed to go unmuzzled, there is a risk of losing him, because, after having sucked the blood of the rabbit, he will fall asleep; and the smoke which is raised at the mouth of the burrow does not always prove a sufficient expedient for bringing him back, as there are often more issues than one, and as one burrow generally communicates with others, in which the Ferret is apt to be the more bewildered, the more he is surrounded with the smoke.

THE WEASEL.

The common Weasel is as frequent in temperate and in hot countries, as it is scarce in cold ones. Though of the same species, it is in many respects different from the ermine, which is a native of the north.

The Weasel is the smallest of the class to which it belongs, and is an active and handsome little animal. Exclusive of the tail it is not seven inches in length; and its height is not more than two and a half. The tail, which is bushy, measures about two inches and a half. The colour of the Weasel is a pale reddish brown on the back and sides, but white under the throat and belly. The eyes are small and black; the ears short and roundish; and the nose is furnished with whiskers, like those of a cat. It moves by unequal leaps, and can spring several feet from the ground, or run up a wall without difficulty.

When a Weasel enters a henroost, it never meddles with the cocks or the old hens; it makes choice of the pullets, the young chickens, and these it kills with a single stroke on the head, and carries away one after another. The eggs it sucks with incredible avidity; making a small hole at one end, through which it licks out the yolk. In winter, it generally resides in some granary, or hayloft; where the female often continues even in the spring, in order to bring forth her young among the hay or straw. During this time, the Weasel makes war with the rats and ice with more success than the cat, since, following them nto all their holes, it is next to an impossiblity for them to scape. It also climbs up to the pigeon-houses, to the ests of sparrows, &c. and commits great havock. In summer, it removes to some distance from the houses, always hoosing the lower countries about the mills and streams, iding itself among the bushes, in order to catch the birds, nd not unfrequently taking up its habitation in the hollow of an old willow. The female generally brings forth four or five. The young ones come forth with their eyes shut, but in a little time they attain a sufficiency of growth and strength to follow their mother to the chase. They attack adders, water rats, moles, field mice, &c. and, traversing the meadows, devour quails and their eggs.

Like the polecat and the ferret, these animals have so strong a scent that they cannot be kept in any place that is inhabited. As their own smell is very bad, they seem to sustain no inconvenience from any foreign stench or infection. A peasant in my neighbourhood took, one day, three Weasels newly brought forth in the carcass of a wolf which had been suspended by its hind legs from one of the branches of a tree; and though the wolf was almost entirely rotten, the old Weasel, nevertheless, brought grass, straw, and leaves, in order to make a bed for her young ones in the cavity of the thorax. The Weasel may be tamed, and is then very good tempered, and excessively curious.

THE ERMINE, OR STOAT.*

The weasel with a black tail is called the Ermine when it is white, and the Stoat when it is red or yellowish.

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* Godman considers the common Weasel of the United States to be the same as the Ermine or Stoat of Europe. He says that in the

Though it is a less common animal than the Weasel, yet there are numbers to be found in the old forests, and sometimes during the winter in the neighbourhood of woody grounds. It is always easy to distinguish it from the common weasel, because the tip of its tail is uniformly of a deep black, while the edges of its ears, and the extremities of its feet, are white.

CHAP. XII.

Of certain smaller Animals of the carnivorous Class...The Squirrel...The Rat...The Brown Rat...The Water Rat...The Mouse....The Long-tailed Field Mouse...The Short-tailed Field Mouse...The Shrew Mouse...The Water Shrew Mouse...The Bat...The Fat Squirrel... The Garden Squirrel, or Great Dormouse...The common Dormouse...The Guinea Pig...The Mole...The Hedgehog...The Marmot.

THE SQUIRREL.

The common Squirrel of Europe is a beautiful little animal, which is only half wild, and which, by its gentleness, its docility, and even the innocence of its manners, might deserve to be exempted from the present class. It is neither properly a carnivorous nor an injurious animal, though it sometimes seizes on birds; its general food consisting of fruit, almonds, hazle-nuts, beech-mast, and acorns: it is neat, cleanly, alert, lively, and industrious;

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middle and eastern states it is most generally known as the *Weasel*. Farther north it is called *Stoat* in its summer, and Ermine in its winter pelage of pure white. Richardson says that both the Ermine or Stoat, and the common Weasel of Europe are indubitably found in America; the former extending to the most remote arctic districts, and the latter as far north as the Saskatchewan river.

its eyes are large, black, and full of fire, its countenance is sharp, its body is nervous, and its limbs are supple. It is of a bright brown colour, inclining to red; the breast and belly are white; the ears are ornamented with long tufts of hair. The fore feet are strong and sharp, and the fore legs are curiously furnished with long stiff hairs, projecting on each side like whiskers.

The beauty of its form is yet heightened by a spreading tail, in shape like a plume of feathers, which it raises above its head, and forms into a kind of shade for itself.

The Squirrel may be said to be less a quadruped than almost any other four-footed animal. It generally holds itself almost upright, using its fore feet as hands for a conveyance to its mouth. Instead of hiding itself in the earth, it is continually in the air: it somewhat resembles the birds by its lightness and activity; like them, it rests upon the branches of trees; leaping from one to the other, and in the highest of them builds its nest. It avoids the water still more than the earth; and it is even asserted of this animal, that, when it is obliged to cross a river or stream, it uses the bark of a tree, or some such light woody substance, as a boat, while its tail supplies the place of sails, and of a rudder. It gathers together a quantity of nuts during the summer, which it deposits in

the hollow part of some old tree, and to these has recourse for provision in winter; and such is the agility of its body, that it will, in an instant, climb a beech tree, let its bark be ever so smooth.

There are many species which approach to that of the Squirrel, though there are few varieties in the species itself. Some there are of an ash colour, and all the others are red. The small gray Squirrel is of a different species, and remains always gray: and, without mentioning the flying Squirrels, which are very different from the others; the white Squirrel of Cambaye, which is very small, and has a tail like that of the European Squirrel; that of Madagascar, called *Tsitsihi*, which is gray, and which, as Flacourt says, is neither handsome nor fit to be tamed; the white Squirrel of Siam; the gray, and spotted Squirrel of Bengal; the streaked Squirrel of America; the black Squirrel; the gray Virginian Squirrel; the white-striped Squirrel of New Spain; the white Siberian Squirrel; the variegated Squirrel; the little Squirrel of Brazil; that of Barbary; the *palmist*, &c. form so many species entirely distinct and separate from that of which we have been treating.

THE LONG-TAILED SQUIRREL

Is about three times the size of the common Squirrel. It is of a blackish colour, and is a native of Ceylon and Malabar.

THE PALM SQUIRREL.

The Palm Squirrel is a native of the southeastern part of Asia and the neighbouring islands, and is about the size of a rat. It lives upon palm trees. It is a familiar creature, and will enter houses, and pick up crumbs that drop from the table. Its back is variegated with stripes.

GRAY SQUIRREL OF EUROPE.

This animal is nearly the size of the American gray Squirrel. It migrates to immense distances. It crosses rivers on a piece of pine bark, and uses its tail as a sail. It makes its nest in hollow trees; and lays up stores of provisions for winter use, in holes made in the ground.

SQUIRREL OF BARBARY AND SWITZERLAND.

THE Squirrel of Barbary resembles the palm Squirrel, but there is still reason to believe them separate animals. The Swiss Squirrel lives in the earth, and forms a retreat that water cannot penetrate. It bites unmercifully, and is more like a rat than a Squirrel in his nature.

SQUIRRELS OF AMERICA.

WE have selected from Godman and Richardson, the following species of American Squirrels, with a few of the localities and peculiarities of each.

The FOX SQUIRREL is found throughout the southern States, where it frequents the pine forests in considerable numbers, and derives its principal subsistence from the seed of the pine. The nest is placed in the top of a high pine

go together. In general, the Stags are inclined to remain with each other, and to roam abroad in companies; it is only from fear or necessity that they are ever found dispersed or separated.

The growth of the horns appears to depend on the redundancy of the fluids, and has a near connexion with the production of the seminal fluid, since, when castrated, the horns of the Stag cease to grow. The beauty of this, as indeed of every part, depends much upon their food; for a Stag which lives in a plentiful country, where he feeds at his ease, where he is neither disturbed by men nor dogs, where, after having eaten without interruption, he may lie down and ruminate in quiet, has always a beautiful head, high, open, palmated, large, and well adorned at top, broad and curled at bottom, with a great number of long and strong antlers; whereas, in a country where he has neither sufficient food nor repose, his head will be in these respects the reverse, insomuch that it is no difficult matter to distinguish, by the horns of a Stag, whether or not he inhabits a plentiful and quiet country, and whether or not he has been well nourished.

The branches which sprout from the head of the Stag, in their make and growth, resemble those of a tree; their substance also is, perhaps, more of the nature of wood than of bone: it is, as it were, a vegetable grafted upon an animal, which partakes of the nature of both, and forms one of those shades by which Nature always approximates two extremes.

The Stag passes his whole life in the alternatives of plentitude and want, of corpulence and leanness, of health and sickness, without having his constitution much affected by the violence of the change; nor is the duration of his life inferior to that of other animals which are not subject to such vicissitudes. As he is five or six years in

The **COMMON GRAY SQUIRREL** is remarkable for its beauty and activity, and is common throughout the United States. It is generally found in hickory and chesnut woods, where it feeds on nuts, and lays up a hoard for the winter. They construct their nests with care on the tops of tall trees, and seldom leave them during the cold weather. They do a great deal of mischief in the corn fields, by destroying and carrying off a great quantity of corn. They are very easily domesticated, and in captivity are very playful and mischievous. The gray Squirrel is commonly of a fine bluish gray, mingled with a golden colour.

The **GREAT TAILED SQUIRREL**, so called from the length of its tail, is common on the Missouri. It is of a grayish black colour, and is very graceful and active.

The **LINE TAIL SQUIRREL** inhabits the Missouri country, where it builds its nest in the holes and crevices of rocks. It is fond of the naked cliffs, where there are but few bushes, and very rarely ascends a tree. It feeds on buds, leaves, and fruits of plants. It is of an ash colour intermixed with white hairs. Its fur is coarse, and the tail which is very long, is marked with three black lines on each side.

The **FOUR LINED SQUIRREL** is found on the Rocky Mountains. Its nest is composed of a great quantity of the branches of different kinds of trees, and with other vegetable productions. It does not ascend trees by choice. This Squirrel is marked, on the head and back, with white lines. It is exceedingly active and industrious.

The **COLUMBIAN PINE SQUIRREL** was seen by Lewis and Clark on the banks of the Columbian river, but is supposed by Richardson to be a variety of the Hudson's Bay Squirrel; its habits being similar.

The COMMON RED or HUDSON'S BAY SQUIRREL is abundant in most parts of North America. It is one of the most lively and nimble of the Squirrel race. It digs burrows at the roots of large trees, to which it forms four or five entrances.

It does not leave its tree in cold and stormy weather, but when it is sporting in the sunshine, if any one approaches, it conceals itself, and makes a loud noise, similar to a watchman's rattle. From this circumstance it has received the name of Chickaree. When pursued, it makes long leaps from tree to tree, and seeks for shelter as soon as possible in its burrow. The skin of this animal is of no value. It is of a reddish brown colour, shaded with black. The tail is long and beautiful.

The RED BELLY SQUIRREL is said to be found near New Orleans. It is of a grey colour above, with a bright yellowish red beneath.

The GROUND or STRIPED SQUIRREL is abundant in all our woods. It is sometimes called Harkee, and, in New England, is usually denominated the Chip Squirrel. It differs

very much from other Squirrels in its habits. It never makes its nest in the branches of trees, but burrows in the ground near the roots. These burrows extend a considerable distance under ground, and are always provided with two openings. The general colour of this animal is of a reddish brown. On the back there are five black and two white lines, extending the whole length of the body. The head is also marked with stripes.

The COMMON FLYING SQUIRREL* is very abundant in the United States, and is much admired for the softness of its fur, and the gentleness of its disposition. The skin of the sides is extended from the fore to the hind limbs, so as to form a sort of sail, which enables it to descend swiftly from a great height, in the easiest and most

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[*] Flying Squirrels are said to be found in the north of Europe, but they are very scarce.

pleasant manner, often passing over a considerable space. This Squirrel is small, of an ash colour above, and white beneath, with large, prominent black eyes. It builds its nest in hollow trees.

The SEVERN RIVER FLYING SQUIRREL is much larger than the species described above, has a longer tail, and is of a different colour. It is found near James' Bay and Lake Huron.

The ROCKY MOUNTAIN FLYING SQUIRREL lives in thick pine forests, and seldom leaves its retreats except at night. It resembles the Severn River Flying Squirrel in form, though its limbs and tail are larger. It is of a yellowish brown colour.

THE RAT.

If we descend by degrees from the great to the small, and from the strong to the weak, we shall find, that Nature has uniformly maintained a balance; that, attentive only to the preservation of each species, she creates a profusion of individuals, and is supported by the numbers which she has formed of a diminutive size, and to which she has denied weapons, strength, and courage.

Under the general name of Rat, several species of small animals have been comprised. The first of these, known in England by the name of the *Black Rat*, where it is indigenous, is carnivorous, and even, if the expression is allowable, *omnivorous*. Hard substances, however, it prefers to soft ones: it devours wool, stuffs, and furniture of all sorts; eats through wood, makes hiding places in walls, thence issues in search of prey, and frequently returns with as much as it is able to drag along with it, forming, especially when it has young ones to provide for, a magazine of the whole. The females bring forth several times in the year, though mostly in the summer season; and they usually produce five or six at a birth.

In defiance of the cats, and notwithstanding the poison, the traps, and every other method that is used to destroy these creatures, they multiply so fast as frequently to do considerable damage. On board a man of war they have been known to consume a hundred weight of biscuits daily,

and when, to destroy them, the ship has been smoked between decks, six hampers a day have for some time been filled with their carcasses. The Isle of France was once abandoned on account of their immense swarms, and, even now, they are a severe scourge to it. In old houses, in the country especially, where great quantities of corn are kept, and where the neighbouring barns and haystacks favour their retreat, as well as their multiplication, they are often so numerous, that the inhabitants would be obliged to remove with their furniture, were they not to devour each other. This we have often, by experience, found to be the case when they have been in any degree straitened for provisions; and the method they take to lessen their numbers, is, for the stronger to fall upon the weaker. This done, they lay open their skulls, and first eat up the brains, afterwards the rest of their body. The next day, hostilities are renewed in the same manner; nor do they suspend their havock till the majority are destroyed. For this reason it is, that, after any place has for a long while been infested with Rats, they often seem to disappear of a sudden, and sometimes for a considerable time.

The female always prepares a bed for her young, and provides them immediately with food. On their first quitting the hole, she watches over, defends, and will even fight the cats, in order to save them. The weasel, though a smaller animal, is, however, a still more formidable enemy than the cat. The Rat cannot inflict any wounds but by snatches, and with his fore teeth, which, however, being rather calculated for gnawing than for biting, have but little strength; whereas the weasel bites fiercely with the force of its whole jaw at once, and, instead of letting go its hold, sucks the blood through the wound. In every conflict with an enemy so dangerous, it is no wonder, therefore, that the Rat should fall a victim. The black Rat has

nearly been exterminated in England by the brown Rat, which was introduced from Norway.*

There are many varieties in the Rat species. The white Rat, like the white mouse, the white rabbit, and all other animals which are entirely of that colour, has red eyes. The white species, with all its varieties, appears to belong to the temperate climates of the eastern continent, and have been diffused in much greater abundance over hot countries than cold ones. Originally they had no Rats in America; and those which are to be found there in such numbers at this day, are the produce of Rats which accidentally obtained a footing there with the first European settlers. Of these the increase was so great, that the Rat was long considered as the pest of the colonies; where, indeed, it had hardly an enemy to oppose it. The European ships have likewise carried these animals to the East Indies, into all the islands of the Indian Archipelago, as well as into Africa, where they are found in great numbers. In the North, on the contrary, they have hardly multiplied beyond Sweden.

THE BROWN RAT

Is both stronger and more mischievous than the black Rat; it has a reddish skin, a long tail, the back bone arched like that of the squirrel, the body much thicker, and whiskers like those of a cat. It is about nine inches long, and has a tail of the same length as the body, covered with minute dusky scales, thickly interspersed with short hairs. It is considerably within half a century since that species

has been spread in the neighbourhood of Paris.* † They multiply indeed prodigiously, since it is well known that they generally produce twelve or fifteen, often sixteen, seventeen, eighteen, and even nineteen young ones at a time. The males are larger, stronger, and more mischievous than the females. When any one pursues, and endeavours to take them, they will turn again, and bite the hand or stick which touches them. Their bite is not only sharp but dangerous, and is immediately followed by a considerable swelling; and the wound, though small, is yet long in being closed. They bring forth three times in a year, the dams previously preparing a bed for their young; and thus two individuals of this species produce at least three dozen in the space of twelve months.

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* Richardson says that "this very destructive animal came, according to the accounts of historians, from Asia to Europe about the beginning of the seventeenth century."

The Brown Rat in its nature, and some of its habitudes, bears a resemblance to the water Rat. Though there is no place in which they will not fix their residence, they yet seem to delight in living near the water. When they find themselves pursued, and have the same opportunity of sheltering themselves in the water, or in a thorny thicket, they prefer the former, plunge into it without dread, and swim with amazing facility. This particularly happens when they cannot get back to their burrows; for they always dig holes for themselves in the earth, or else occupy those of the rabbit. They may also be taken, like that animal, by means of the ferret, which follows them underground in the same manner as it does the rabbit, and seemingly with even more ardour.

These animals live principally upon fruit and corn, but are, notwithstanding, exceedingly carnivorous. They de-

vour young rabbits, partridges, and other birds; and when they enter a hen-roost, they destroy, like the pole-cat, more than they can eat. They do not become torpid in the winter, like the dormouse, but take advantage of every fine day to come out of their subterranean mansions. Those which live in barns drive away the mice; and it has even been remarked in Europe, that the black Rats as they are called, have been far less common since th Brown Rats became so numerous.

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* It has not been known in England above sixty years, though now almost, if not quite, the only species of Rat. ED.

† Harlan says it was not known in America, till 1775.

THE WATER RAT

Is a little animal, about the size of the black Rat, but in its nature and habits rather resembling the otter than the Rat. Like the otter, it frequents the fresh waters, and is generally found on the borders of rivers, rivulets, and ponds: like that creature, too, it seldom feeds but upon fish, or the spawn of fish, though sometimes it eats frogs, water-insects, and even roots and herbs. This animal is not web-footed; but, though every toe of its feet is separated, it swims with facility, keeps itself a long time above water, and carries off its prey, in order to eat it when it has reached the land.

The head of the Water Rat is shorter, the nose broader, the hair more erect, and the tail much longer than that of the land Rat. On the back it is of a fine raven black; the under part is white, with a black line along the middle. The body is about three inches long. The fur has an astonishing power of resisting water. Like the otter, it flies from large rivers, or rather from those which are too much frequented, and is never found either in houses or in barns.

It is probable, that these animals bring forth often in a year; but of this we have no certain information. Their flesh is not absolutely bad; and, in Catholic countries, the

peasants eat it during the Lent, as they do that of the otter. The species is to be found throughout Europe, the very extremities of the north excepted. In Holland it is devoted to destruction, as one of the most dangerous enemies of the country, in consequence of its burrowing in the dykes.

THE MOUSE

Is an animal smaller than the rat, as also more numerous, and more generally diffused. Its instinct, its temperament, its disposition is the same; nor does it materially differ from the rat, but by its weakness, and the habits which it contracts from that circumstance. By nature timid, by necessity familiar, its fears and its wants are the sole springs of its actions. It never leaves its hiding place but to seek for food; nor does it, like the rat, go from one house to another, unless forced to it, or commit by any means so much mischief. When viewed without the absurd disgust and apprehension which usually accompanies, or is affected at the sight of it, the Mouse is a beautiful creature; its skin is sleek and soft, its eyes bright and lively, all its limbs are formed with exquisite delicacy, and its motions are smart and active. Though one of the most timid of creatures, the Mouse may be taught to repose confidence in mankind, and will quit its place of refuge to receive food. Some few of this species are of a pure

white color, with large red eyes; but whether they be a permanent kind, or only an accidental variety, cannot well be determined.

But for its immense fecundity, the species of the Mouse could not subsist. Even in mousetraps they have been known to bring forth. They produce at all seasons, and several times in the year. Their usual number at a birth is five or six; and these, in less than fifteen days, attain growth and strength sufficient to run about and shift for themselves. As in these respects they soon attain perfection, so the duration of their life must be very short; a circumstance which cannot but heighten our idea of their prodigious multiplication. Aristotle tells us, that, having put a pregnant Mouse into a vessel of corn, he soon after found in it no less than one hundred and twenty Mice all sprung from one original.*

THE LONG-TAILED FIELD MOUSE

Is smaller than the rat, but larger than the common Mouse, and does not live in houses. It is remarkable for the largeness and prominence of its eyes; it differs likewise both from the rat and the mouse in the color of its skin, which, while it is tolerably white under the belly, is of a reddish brown upon the back. The species is generally and abundantly diffused.

It appears that they are a long time in attaining their full growth, as they vary considerably in size. The largest are rather more than four inches in length, from the tip of the nose to the insertion of the tail; and the smallest, which appear to be full grown as well as the others, are an inch shorter. As there are found many of different inter-

mediate sizes, however, there is no room to doubt but that the larger and the smaller are all of the same species.

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* This animal, like the rat, was introduced into America from Europe.

These creatures are fond of dry and elevated grounds. In woods, and in the fields adjoining to them, they are to be found in great numbers. They conceal themselves in holes, which they either find already made, or which they make for themselves, under bushes, or the trunks of hollow trees. In these they amass so prodigious a quantity of acorns, nuts, &c. that in one single hole there has been found a bushel at a time; and this provision, instead of being proportioned to the wants of the animal, is only so to the capacity of the place allotted for its reception. These holes are generally more than a foot under ground, and often divided into two cells, of which the one serves for a habitation for itself and its young ones, and the other for a granary. The only method of preventing their ravages, which has appeared effectual, is that of setting traps at every tenth pace through the whole extent of each piece of new sown land. There wants no other bait than a roasted nut laid under a flat stone, which is to be supported by a small bit of wood. This they will eagerly attempt to seize; and, being fixed to the wood, no sooner do they touch it, than the stone falls upon them, and stifles or crushes them to death.

THE SHORT-TAILED FIELD MOUSE

Is still more common, more generally diffused than the long-tailed kind, and is found almost every where; in woods, in meadows, and even in gardens. It is remarkable for the thickness of its head, and the shortness of its tail, which is not above an inch in length. It forms holes in the earth, where it hoards up corn, nuts, and acorns; though the former of these it seems to prefer to every other kind of aliment. About the month of July, when

the corn begins to ripen, they flock together from all sides, and frequently do great damage, by cutting the stalk, in order to come at the ear. In autumn and winter, the greater part of them withdraw into the woods, where they find beach-mast, nuts, and acorns. Some years they appear in such great numbers, that they would destroy every thing, were they to subsist for any length of time. For want of other food, however, they often destroy and eat one another, and are themselves the usual prey of the fox, the wild cat, the martin, the weasel, and of the long-tailed field Mouse.

There is another species of field Mouse, called the HARVEST MOUSE, which is the smallest of British quadrupeds; two of them not weighing more than one halfpenny. This kind makes a beautiful nest, as round as a cricket ball, and about the same size.

AMERICAN FIELD MOUSE.

THIS little Mouse is very common throughout this country. In its habits and appearance it closely resembles the European field Mouse, and is perhaps only a variety of that animal.

OTHER AMERICAN RATS AND MICE.

BESIDES those already noticed, there are several other kinds of animals resembling the Rat and Mouse, of which we shall give a brief account.

The COTTON RAT, or Hairy Campagnol, is found in East Florida. It burrows in gardens and in deserted plantations on the banks of rivers. It derives its name from the circumstance of its making its nest of cotton, which it collects in great quantities. The nest is placed generally in a hollow log.

The JUMPING MOUSE, when not in motion, might be mistaken for the field Mouse. It is found from Canada to Pennsylvania, and is of the size of the common Mouse. It is of a reddish brown colour, and has very short fore legs. Its hind legs are of great length, and enable it to leap over five or six feet of ground at every spring. When pursued, its movements are like those of a bird, so high does it leap, and so light and quick is its ascent and descent. It runs also with speed, and it is in vain to attempt to catch it.

These animals remain torpid during the winter, wrapping themselves in a coat of clay, so curiously as to conceal itself entirely. In the spring they sally forth into the grain and grass fields, and do considerable mischief to the farmers by their depredations.

The LABRADOR JUMPING MOUSE closely resembles the preceding species in its habits, and is a very common animal in the fur countries, as far north as Slave Lake. It is of a brown colour above, and white beneath.

The **Wood-Rat** is found in Florida and Missouri. It burrows under stones, and among the ruins of old buildings, and builds its nest of large quantities of rubbish. It is peculiarly inoffensive in its habits, and is of a timid and gentle disposition. This animal is said to construct its habitations with great labor, raising pyramids three or four feet high, of dry branches, so interwoven that it is very difficult to destroy them.

Of the **Meadow Mouse** there are five kinds, viz. **Bank Mouse**, **Yellow-Cheeked**, **Wilson's**, **Sharp-Nosed**, and **Northern**. They all resemble each other in form and colour, though they differ somewhat in their habits. Richardson supposes there are still other species.

POUCHED RATS.

These animals, of which there are several kinds, have a strong resemblance to the mole. The common Pouched Rat is found in abundance in Florida, Georgia, and Missouri, and their burrows are so numerous, as to give the ground where they are made, the appearance of ploughed land, a small hillock of earth being raised over each burrow. By the aid of its long claws, this animal is enabled to make its way under ground with great rapidity. But little is known of its habits, as it is peculiarly vigilant, and seldom makes its appearance in the day time. It takes its name from the pouches which it has on the cheeks, which give it a very singular appearance.

Richardson mentions four other kinds of Rats with cheek pouches, viz. Columbia Sand-Rat, Lead Beater's Sand-Rat, Canada Pouched Rat, and mole-shaped Sand-Rat. These all burrow in the ground like the mole.

CAMAS RAT, OR GOPHER.

THIS animal is found on the Columbia and Missouri rivers. It lives beneath the surface of the earth, and eats roots. The head appears large and clumsy, owing to its cheek pouches. The root of the Camas plant is its favorite food, from which it derives its name. It is said by Schoolcraft, to employ its pouches in carrying dirt out of its hole, and Richardson adopts this account as true; but an intelligent individual, who has spent much time in the country which it frequents, assures us that he has often seen the Gopher at work, and that it brings up the dirt with its broad feet. The quantity that it will throw out in a short space of time, is truly astonishing.

THE SHREW MOUSE

SEEMS to form a shade in the order of small animals, and to fill up the vacuum between the rat and the mole. The Shrew Mouse is smaller still than the domestic Mouse, and resembles the mole in its snout, which is longer than its jaw bones; in its eyes, which, though rather larger than those of the mole, are, however, in like manner concealed, and much smaller than those of the domestic Mouse; in the number of its claws, of which it has five to each foot; in its tail, and its legs, particularly those behind, which are shorter than those of the domestic Mouse; and, lastly, in its ears, and in its teeth.

This diminutive creature has a strong smell, which is peculiar to itself, and so offensive to cats, that, though they will cheerfully chase and kill the Shrew Mouse, they yet will not eat its flesh like that of the domestic Mouse. It is evidently this noisome odour, this aversion of the cat to it, that gave rise to the notion, that the Shrew Mouse is a venomous animal, and that its bite is so dan-

gerous to cattle of all sorts, and particularly to horses. The truth, however, is, that it is neither venomous nor capable of biting; for it cannot open its mouth sufficiently wide to seize the double thickness of the skin, which is absolutely necessary, in order to bite. The distemper among horses, it is farther to be observed, which the vulgar attribute to the tooth of the Shrew Mouse, is a swelling which proceeds from an internal cause, and has no connection with any bite, or rather scratch, that this little animal may give.

In winter especially, the Shrew Mouse generally fixes its residence in some hayloft, stable, or barn, where it feeds on grain, insects, and putrified flesh. It is likewise found in woods and fields, where, living on corn, it sometimes conceals itself under moss or leaves, sometimes under the trunks of trees, sometimes in holes abandoned by moles, and sometimes in holes of a smaller size, which it forms for itself by digging with its claws and snout.

The Shrew Mouse produces, it is said, as many at a birth as the domestic Mouse, though less frequently. It has a squeak much more sharp and piercing than the latter. In point of nimbleness, however, it is far inferior; and as it both sees imperfectly, and runs slowly, there is little difficulty in taking it.

The usual colour of these creatures is brown, with a mixture of red; others of them are ash-coloured; and in all there is a greater or less degree of whiteness upon the belly. They are very common throughout Europe; and in America, there are several species of a small size. Among them are the Small Shrew and the Short-tail Shrew. The first is found on the Missouri, and the latter on the Rocky Mountains. Godman mentions a third species, and Richardson notices two others, American Marsh Shrew, and Fosters Shrew Mouse.

THE WATER SHREW MOUSE,

Though a native of Europe was yet unknown to any of the naturalists, till M. Daubenton first discovered it. Every thing necessary to be added here, with respect to the Water Shrew Mouse, is, that it is taken at the sources of fountains, in the morning and evening, as the sun rises and sets; that in the day time it remains concealed in the clefts of rocks, or in holes under ground, near the edges of rivulets; that it brings forth in spring, and commonly produces nine young ones at a time.

THE CHINCHILLA.

This interesting animal, which produces the fur which passes under its name, is a species of Field Mouse, and is common in the high plains of Chili and Peru. It is about nine inches in length, and has a tail about half the length of its body. It sits upon its haunches, and takes its food in its fore paws like a squirrel. It feeds chiefly upon bulbous roots.

THE BAT.

AN animal, which, like the Bat, is half quadruped and half bird, and which, in fact, is neither the one nor the other, s a kind of monster. In the Bat, the fore feet are, properly speaking, neither wings nor feet, though the animal uses them for the purpose of flying, and occasionally of moving along upon the ground. They are, in fact, two shapeless extremities, of which the bones are of a monstrous length, and connected by a membrane, not covered with feathers, or even with hair, like the rest of the body: they are a kind of winged paws, or hands, ten times larger than the feet, and, in all, four times longer than the whole length of the body of the animal: they are, in a word, parts which have rather the appearance of a capricious and accidental, than a regular and determined production.

To these incongruities, these disproportions of the body and members, may be added the still more striking deformities of the head. In some species, the nose is hardly visible, the eyes are sunk near the tip of the ear, and are confounded with the cheeks; in others, the ears are as long as the body, or else the face is twisted into the form of a horse-shoe, and the nose covered with a kind of crust. Averse, likewise, to the society of all other creatures, they shun the light, inhabit none but dark and gloomy places, to which, after their nocturnal excursions, they are sure to return by break of day, and in which they remain, fixed, as it were, to the walls, till night again approaches.

Their motion in the air is with less propriety to be term-

ed a flight, than a kind of uncertain flutter, which they seem to execute by struggles, and in an awkward manner. They raise themselves from the ground with difficulty, never soar to a great height, and are but imperfectly qualified to accelerate, or even to direct, their flight. This, far from being either rapid, or very direct, is performed by hasty vibrations in an oblique and winding direction; and in passing along they do not fail to seize all the gnats, moths, and other nocturnal insects that come in their way. These they swallow entire; and in their excrements we meet with the remains of wings and the other dry parts, which they have not been able to digest. Like quadrupeds, the Bat brings forth its young alive, and like them it has teeth and nipples.

From the observations of Spallanzani, it appears that the Long-eared, the Horseshoe, and the Noctule Bats possess an additional sense, by which, when deprived of seeing, they are enabled to avoid any obstacles that may be in the way of their flight.

It is affirmed that these animals do not produce more than two at a birth, and that these they suckle, and even carry along with them as they fly. They unite in numbers to defend each other from the cold; they pass the winter without awaking, without stirring, and without eating, from the end of autumn till spring. Though they can more easily support hunger than cold, and can even subsist a number of days without food, they yet belong to the number of carnivorous animals; for, when opportunity serves, they will devour bacon, and meat of all kinds, whether raw or roasted, whether fresh or corrupted.

AMERICAN BATS.

Of these, Godman notices five kinds, viz. the Carolina Bat, Hoary Bat, Cuenated Bat, Subulate Bat, and New York Bat.

THE FAT SQUIRREL, OR DORMOUSE.

Of this kind of animal we know three species, which, like the marmot, sleep during the winter; namely, the Fat Squirrel, the Garden Squirrel, and the common Dormouse. Many authors have confounded these species together, though they are all three very different, and of consequence easily known and distinguished.

The Fat Squirrel is nearly of the size of the common European Squirrel, and, like it, its tail is covered with long hair. It is of a pale ash colour on the upper parts of the body, and whitish on the under. It is without propriety that the term *sleep* has been applied to the state of these animals during the winter. They are not in a state of natural sleep at this period; they are in a torpor, which is produced by the coldness of the blood, and by which they lose the use of their members and senses. Their internal heat is indeed so small, that it hardly exceeds that of the temperature of the air. When the heat of the air is at ten degrees above the freezing point of the thermometer, the heat of these animals is also at ten degrees. Now it is well known, that the internal heat of man, and of the generality of animals, exceeds at all times thirty degrees; and therefore there is little reason to wonder why these animals, so inferior to all others in point of heat, should become torpid as soon as their little quantity of internal heat ceases to be assisted by the external heat of the air; a circumstance which naturally happens when the thermometer is not more than ten or eleven degrees above congelation. This is the real cause of the torpor of these animals; a cause of which naturalists have not been apprized, and which, nevertheless, extends to all animals that sleep during the winter.

This torpor continues as long as the cause which pro-

duces it continues, and ceases when the cold ceases. A few degrees of heat above the tenth or eleventh degree are sufficient to reanimate these creatures; and if they are kept in a very warm place during the winter, they do not become torpid at all.

Though in this torpid state, they are without the smallest motion, though their eyes are shut, and they seem to be deprived of all use of the senses, they yet feel pain when it is very acute. This they testify by a movement of contraction, as also by a little hollow cry, which they even repeat several times. I am inclined to believe, that it is not from too great waste of substance that they sometimes perish in long winters, since in autumn they are excessively fat, and on their reviving in spring, they are found to have still remained so; this abundance of fat being an internal nourishment which is sufficient to support them and to supply what they lose by perspiration.

The flesh of the Fat Squirrel is not unlike that of the guinea-pig. They were considered as a dainty by the Romans, who fattened great numbers of them in receptacles called *gliraria.* Like the common Squirrel, this animal lives in forests, climbs to the tops of trees, and leaps from branch to branch. This it does less nimbly indeed than the Squirrel, whose legs are longer, whose belly is by no means so big, and which is remarkable for being meagre. Nuts, however, and other wild fruits, form its usual nourishment. It likewise eats little birds, which it takes in the nests. It does not, like the Squirrel, nestle in the upper parts of trees, but makes a bed of moss in the trunks of those which are hollow. It also shelters itself in the clefts of rocks, and always manifests a preference for dry places. It avoids moisture, it drinks little, rarely descends to the ground, and, unlike the Squirrel, which is easily tamed, remains always wild. The species is very

generally diffused in Europe, but there are few or none of them in England.

THE GARDEN SQUIRREL, OR GREATER DORMOUSE.

The fat Squirrel frequents the forests, and seems to shun the habitations of man; the Garden Squirrel, on the contrary, inhabits gardens, and is sometimes to be found in houses. The species of the latter is also more numerous, and more generally diffused. It is of a tawny colour on the upper part of the body, and whitish ash, tinged with yellow, on the under. Round each eye it has a black circle, and a black spot behind each ear.

These animals nestle in the holes of walls, climb up trees, choose the best fruits, and gnaw them as they begin to ripen. To peaches, in particular, they are exceedingly destructive. They climb up pear, apricot, and other trees; and in a scarcity of other fruit, they eat almonds, nuts, and even leguminous plants. These they carry in great quantities to their holes, where they make a bed of herbs, moss, and leaves. The cold stupifies, the heat revives them; and sometimes there are eight or ten found in one place, all in a state of torpor, all huddled together, and rolled up in a ball, in the midst of their hoard of provisions. Their flesh is not eatable, and has even the disagreeable smell of the house rat.

This animal is to be found in all the temperate climates of Europe, and even in Poland, and in Prussia; but it does not appear that there are any in Sweden, or in any of the more northern countries.

THE COMMON DORMOUSE.

Its eyes are sparkling, full, and black; its tail is tufted, and its hair of a tawny red. The throat is white. It never lives in houses, is seldom to be found in gardens, but

chiefly frequents the woods, where it finds a shelter in the hollow of some old tree.

The species is by no means numerous, yet they seem to be tolerably common in Italy, and to be not unknown even in the northern climates; but it does not appear to be an English animal; for Ray, who had seen it in Italy, observes, that the small Dormouse which is found in England is not red upon the back, like the Italian, and that it probably belongs to another species.

The Dormouse becomes torpid by the cold, and rolls itself up in a ball; it revives in mild weather, and hoards up nuts and other dry fruits for future sustenance. It forms its nest in trees, like the squirrel, though generally in a lower situation, among the branches of a nut tree, in a bush, &c. The nest is composed of interwoven moss, leaves, and grass; is about six inches in diameter; has no aperture but at the top, and contains three or four young ones.

THE GUINEA-PIG, OR RESTLESS CAVY,

Though originally a native of the warm climates of Brazil and Guinea, lives, however, and breeds in temperate and even cold countries, provided it is properly taken care of. Its skin is of little or no value; and the flesh, though people may, and actually do eat it, is very indifferent food; a circumstance which might, in some measure, be removed, were they to be reared in warrens, where they might have air, space to range in, and a proper choice of

young, and as the growth of the young Roebuck is quicker than that of the young stag, so his life is shorter, and does not appear to extend beyond twelve or fifteen years, at the farthest. The Roebucks remain in winter in the thickest coppices, and live on briars, broom, heath, &c. In spring, they repair to the more open groves, and browse upon the buds and young fresh leaves of almost every tree; and this warm food, fermenting in their stomachs, inebriates them in such a manner, that they are then easily surprised.

The Roebuck is the smallest of the British deer. The species is now nearly extinct in England. They are somewhat more plentiful in the highlands of Scotland.

It appears that this species, which is not so numerous as that of the stag, and which is very seldom to be found in many parts of Europe, is much more abundant in America. There we hear only of two sorts, the red, which is the larger, and the brown, which is the smaller; and, as they are more commonly found in the northern than in the southern parts of that continent, so it may be presumed, that they differ more from each other there than they do in Europe. In Louisiana, for instance, they are extremely common, and much larger than in France; they are also found at Brazil; for the animal which is there denominated the *Cujuacuapara*, differs not from the European Roebuck more than the Canadian stag differs from the French stag.*

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* It is surprising at this late day to find respectable works on natural history, retaining such a passage as this. The Roebuck is found in no part of America, nor is there any animal that could well be mistaken for it. The animal referred to is evidently the common fallow deer, or Virginia deer. We shall have occasion to notice this subject more fully, in a subsequent part of this work.

So cleanly are Guinea-pigs, that much of their time spent in licking and smoothing the fur of each other, an of the little ones; and should the latter chance to be dirtied, the mother will never again suffer them to come near her. If kept in a room, it seldom crosses the floor, but creeps round by the wall.

These animals are so delicate, that it is with difficult they undergo the rigours of winter. When they feel the cold, they assemble together, press close to one another and in this situation are frequently found dead.

THE MOLE,

Without being blind, has such small eyes, and these so concealed, that it was formerly supposed to be able to make little use of the sense of seeing; but it is now known that its eyes possess all the qualities necessary to distinct vision. It enjoys also the senses of hearing and feeling in an eminent degree. Its skin is soft as silk: and its little paws, which are furnished with five claws are very different from those of other animals, and almost like the hands of a human being. Proportioned to the size of its body, its strength is great; it possesses the mild habitudes of repose and of solitude; the art of securing itself, of forming, instantaneously, as it were, an asylum to itself; or extending it, and of obtaining, without the necessity of relinquishing it, an abundant subsistence.

The Mole shuts up the entry to its retreat, which it seldom deserts, unless forced to it by heavy rains in summer. It is fond of cultivated grounds, and is never to be found in those which are either muddy, hard, compact, or stony. It requires a soft soil, well supplied with esculent roots, and with insects and worms, of which, indeed, its principal nourishment consists. In the skinning of worms, which they always do before they eat them, they display much expertness; stripping off the skin from end to end, and squeezing out the contents of the body.

As these animals very seldom come above ground, they have but few enemies; and very readily evade the pursuit of animals swifter and stronger than themselves. The chief calamity which befals them is an inundation; and when this happens, they are seen in numbers attempting to save themselves by swimming, and using every effort to reach the higher grounds. The greatest part, however, perish, as well as the young, which remain behind in their holes. Were it not for such accidents, from their great fecundity, they would become extremely troublesome. They generally have four or five at a time; and it is easy to distinguish among other Mole hills, that in which the female has brought forth her young. These are made with much greater art than the rest; and are usually larger and more elevated. It is probable they produce oftener than once a year. Thus far indeed is certain, that new born Moles are found from the month of April to the month of August; a circumstance which, however, may be owing to their having been engendered and brought forth sooner or later in the year.

The hole in which they produce their young is formed with singular skill, and deserves a particular description. The female begins by erecting the earth into a tolerably spacious apartment, which is supported within by partitions

at proper distance, that prevent the roof from falling. All round this she works, and beats the earth very firm, so as to make it capable of keeping out the rain, let it be ever so violent. As the hillock, in which the apartment is thus formed, is raised above ground, the apartment itself is consequently above the level of the plain, and therefore less subject to accidental slight inundations. The place being thus fitted, she procures grass and dry leaves, as a bed for her young. There they lie secure from wet, and she continues to make their retreat equally free from danger; for all round this hill of her own raising, are holes running into the earth, which go off from the middle apartment, like rays from a centre, and extend about fifteen feet in every direction. These resemble so many walks or chases, into which the animal makes her subterraneous excursions, and supplies her young with such roots or insects as she can provide; but they contribute still more to the general safety; for as the Mole is very quick of hearing, the instant she perceives her little habitation attacked, she takes to her burrow, and unless the earth be dug away by several men at once, she and her young always make good a retreat.

Moles live in pairs, between which a warm attachment subsists. They are, however, said to be ferocious, and occasionally to tear and eat each other.

Some authors have said, but without foundation, that the Mole and the badger sleep the whole winter.* That this is not true of the badger, has been already observed; and as a proof that this animal quits its hole in winter as well as in summer, we have only to view the traces it leaves upon the snow. As for the Mole, so far is it from sleeping during the winter, that it continues its subterranean

perations then as well as in summer; and the peasants of rance even proverbially remark, that "when Moles are t work, a thaw is at hand." They are indeed fond of arm places; and the gardeners often catch them round heir beds in the months of December, January, and Feb-uary. In pasture lands, and in nurseries of forest trees, hey do considerable mischief. In 1740, M. de Buffon lanted sixteen acres with acorns, the greatest part of hich were speedily carried away by the Moles. Not ess than a bushel of acorns was found in some of their urrows. The common Mole of Europe is supposed not o inhabit America.

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* In an account of the American Badger we have stated that it lies in a torpid state during the winter.

The Shrew Mole is found in abundance in North America, from Canada to Virginia. It lives principally under ground, in which it burrows with great quickness, by means of its strong and broad hands, armed with sharp claws. These burrows are sometimes very deep, and hills of loose earth are generally found over them. Sometimes one of these creatures shows his head from the centre of one of the hills at mid-day, for the purpose of enjoying the sunshine. They form galleries under ground, by which they can travel in any direction. It is said that they come to the top of the ground daily at twelve o'clock.

The favourite food of the Shrew Mole is the earthworm, though they destroy great numbers of grubs and insects. They are exceedingly attached to a long frequented burrow, and when it is injured, will repair it in a short time; and continue to do so, as often as it is destroyed, with the utmost patience.

This animal is covered with a soft glossy fur; its head is destitute of external ears, though its sense of hearing is very acute. The eyes are so small as scarcely to be perceived. It has great strength and speed, even on the sur-

face of the earth, its movement being the same as when burrowing.

THE STAR-NOSE MOLE burrows on the banks of rivulets and in the soft soil of meadows. The form of the burrows resembles that of the shrew mole, but they are found in different situations; as the Star-nose prefers moist and low places, and the shrew mole is found in dry and elevated spots.

The distinguishing peculiarity of this mole is a remarkable disk, or fringe, that surrounds the nostrils. This has about twenty points, of a rose color, and free from hair. It is from this circumstance that it derives its name. Its food is of the same kind as that of the shrew mole, and it forms hills of earth over its burrows in the same manner.

THE HEDGEHOG,

THE length of which varies from six to ten inches, has the power of defending itself from an enemy without combating him, and of annoying without attacking him. Possessed of little strength, and of no agility by which it might escape its foes, it has received from nature a prickly armour, with a facility of rolling itself up in a ball, and of presenting from every part of its body a poignant weapon of defence. Even from its fear this animal obtains another engine of security; the smell of its urine,

which, when attacked, it generally sheds, being sufficient to disgust its enemy with the contest, and to keep him at a distance. Thus the generality of dogs are content with barking at the Hedgehog, when it falls in their way, without discovering any inclination to seize it. Of these, however, there are some which, like the fox, have had the address to master it, though of the martin, the polecat, the ferret, the weasel, or any of the birds of prey, it has no dread.

When at large in the country, they are generally found in woods, under the trunks of old trees, as also in the clefts of rocks. I do not believe that they climb up trees, as some naturalists have affirmed, or that they make use of their prickles to carry off the fruit; it is with their mouth they seize it; and though they are very numerous in European forests, yet I have never seen one of them upon a tree. They always remain at the foot, in some hollow space, or under moss. They remain in a state of inactivity all day; they only venture abroad by night, and seldom approach human habitations. They sleep during the winter; and therefore every thing that has been said of their laying up provisions for that season, must be false. They at no time eat much, and can subsist very long without any food whatever. Hedgehogs are occasionally eaten, and their flesh is said to be delicate food; their skin is not any longer converted to the smallest use, though the ancients used it for the purpose of a clothes brush.

The Hedgehog may be rendered domestic, and in that state is very useful in destroying cockroaches and beetles, which he pursues and devours with great activity. He is believed also to destroy mice, nearly if not quite as well as a cat. A Hedgehog belonging to the proprietor of an inn at Felton, in Northumberland, Eng. was taught to perform perfectly the duty of a turnspit dog. It ran familiarly round the house, and was very obedient.

"In the month of June, 1782," says a corespondent in the Gentleman's Magazine, " a full grown Hedgehog was put into a small yard, in which was a border of shrubs and annuals. In the course of a few days he formed, beneath a small holly tree, a hole in the earth sufficiently large to receive his body. After a while a small shed was built for him in the corner of the yard, and filled with straw; but the animal would not quit its former situation until it was covered with a stone. He then took possession of the shed, and every morning carried leaves from a distant part of the border, to stop its mouth. His principal food was raw meat and mice. Of the latter he would eat six at a time, but never more; and although these were thrown to him dead, he bit them all in the neck before he began to eat any. He would also eat snails with their shells; but would leave any thing for milk, which he lapped exceedingly slow. To this, even if set six or eight yards distant from his shed, he would almost always come out half an hour before his usual time. If the person who usually fed him neglected to do so, he would follow him along the yard; and if the door was open, he would go into the house. If meat was put near the mouth of his shed in the daytime, he would sometimes pull it in and eat it. As the weather became colder, he carried more leaves into his shed; and sometimes he would not come out for two or three days successively. About the end of November he died; from want of food, as was supposed, but most probably from the severity of the weather."

THE MARMOT,

When taken young, is more capable of being tamed than any other wild animal, and nearly as much so as the domestic ones. It will easily learn to perform feats with a

stick, to dance, and in every thing to obey the voice of its master. It has a great antipathy to the dog; and when it becomes familiar in a house, and is sure of being supported by its master, it will, in his presence, attack the largest dogs, and boldly fasten upon them with its teeth. Though this creature is not quite so large as a hare, it is yet of a more squat make, and has great strength joined to great agility. It has four teeth in the front of the jaw, which are long and strong enough to inflict a terrible wound; and yet, unless provoked to it, it neither attacks dogs, nor does mischief to any creature whatever. If care be not taken, however, it will gnaw the furniture of a house, and will even make holes through wooden partitions.

As the Marmot has very short thighs, and the toes of its paws are formed like those of the bear, so it often sits erect, and walks with ease, like that animal, upon its hind feet. With its fore paws it carries its food to its mouth, and eats in an upright posture like the squirrel. It runs much swifter up hill than down; it climbs trees, and runs up the clefts of rocks, or the contiguous walls of houses, with much facility; so much so, indeed, that it is ludicrously observed of the Savoyards, who are the general chimney-sweepers of Paris, that they have learned their trade from the Marmot.

These animals eat indiscriminately of whatever is given them, whether it be flesh, bread, fruits, herbs, roots, pulse, or insects. Of milk and butter, however, they are particularly fond; and, though less inclined to petty thefts than the cat, they are yet never better pleased than when they obtain access to the dairy.

There seems to be a combination of the bear and the rat in the form of the Marmot. Its nose, its lips, and the form of its head, are like those of the hare; it has the hair and claws of the badger, and teeth of the beaver, the whiskers of the cat, the paws of the hare, with a tufted tail and short ears. The colour of its hair on the back is reddish brown. On the belly it is reddish, but softer and shorter. Its voice resembles that of a little dog, when it is played with or caressed; but when it is irritated or frightened, it raises a loud and shrill cry, highly offensive to the ear. The Marmot is a very cleanly animal. In autumn particularly it is loaded with fat, though all the parts of the body are never equally so. The Marmot would be tolerable food, did it not constantly retain somewhat of a disagreeable smell.

This animal, which delights in the regions of ice and snow, and is never found but on the highest mountains, is, nevertheless, most liable to be benumbed by the cold. From the end of September, or the beginning of October, the Marmot generally retires to its hole, and appears not again till about the beginning of April. The place of its retreat is formed with precaution, and finished with art. It is rather wide than long, and very deep, so that it is capable of containing several, without being under a necessity of crowding each other, or injuring the air they breathe. Their feet and claws are formed as if they were designed to dig; and, in fact, they burrow into the ground with amazing celerity, scraping up the earth, and throwing back what they have loosened behind them constantly as they proceed. Still more wonderful is the form of their hole; it resembles the letter Y, the two branches having each an opening that conducts into one channel, which terminates in their general apartment at the bottom. As the whole is contrived on the declivity of a mountain, there is no part of it on a level but the apartment at the end. One of the branches, or openings, issues out sloping downward; and this serves as a kind of sink, or drain, for the whole family, in which they void their excrements, and through which the moisture of the place finds an easy passage. The other branch, on the contrary, slopes upward, and serves them as a door to go in and out. The apartment at the end is warmly lined with moss and hay. It is even assserted, that this is a public work; that some cut the finest grass, others pile it up, and others take their turns to convey it to the hole. Upon this occasion, it is added, one of them lies upon its back, permits the hay to be heaped upon its belly, keeps its paws upright to make greater room, and in this manner, remaining still upon its back, is dragged by the tail, hay and all, to their common retreat. This practice some assign as a reason for the hair being generally worn away from their backs. However, another and perhaps a better reason may be given for this appearance; namely, their inhabiting cells under ground, and being constantly employed in digging up the earth. Whenever they venture abroad, one is placed as a sentinel, sitting on an elevated rock, while the others amuse themselves in the fields below, or are employed in cutting grass, and making it into hay for their future convenience; and no sooner does their trusty sentinel perceive a man, an eagle, a dog, or any other enemy, than he gives notice to the rest by a kind of whistle, and is himself the last that takes refuge in the cell.

They make no provision for the winter, foreseeing probably that such a precaution would be useless. But when they perceive the first approaches of the season in which their vital motions are to continue in some measure suspended, they labour very diligently to close up the apertures of their dwellings, which they effect with such solidity, that it is more easy to open the earth any where else, than where they have closed it. They are at that time very fat, and some of them are found to weigh twenty pounds. In this plight they continue for three months longer; but by degrees their flesh begins to waste, and they are quite thin by the end of winter. When their retreat is discovered, they are found each rolled into a ball, and covered with hay. In this state they seem entirely lifeless: they may be taken away, and even killed, without their testifying any sense of pain; and those who find them in this manner carry home the fat ones for food, and the young ones for breeding up and taming. The Marmot produces but once a year, and the litter generally consists of three or four. Their growth is quick, and they live only nine or ten years. They are found in the Alps, Apennines, Pyrenees, in the highest mountains of Germany, in Poland, and in America, with some variations.

THE MARYLAND MARMOT, OR WOODCHUCK.

THIS animal is common in all the temperate parts of America. It does great injury to the farmers, as the quantity of herbage it consumes is really surprising. It burrows in the ground on the sides of hills, and these extend to great distances under ground, and terminate in various chambers. Here the Marmot makes himself a comfortable bed of dry leaves, grass, and any soft rubbish, where he sleeps from the close of day, till the next morning is far advanced.

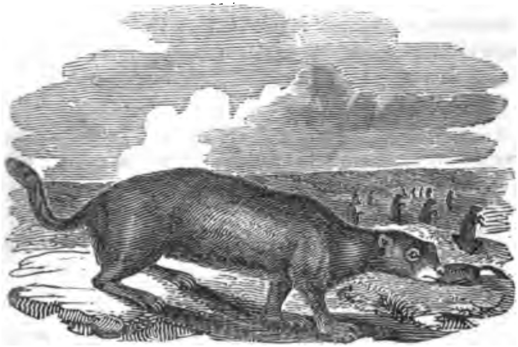
The Maryland Marmot eats with great greediness, and in large quantities. It is fond of cabbage, lettuce, and other garden vegetables. When in captivity, it is exceedingly fond of bread and milk.

At the commencement of cold weather, the Marmot goes into winter quarters, blocks up the door within, and remains torpid till the warm season. It is about the size of a rabbit, and of a dark brown colour.

QUEBEC MARMOT.

This animal is found in the northern parts of America, and resembles the Maryland Marmot in its habits. It is of a grey colour.

PRAIRIE MARMOT, OR WISHTONWISH.



This animal commonly called Prairie Dog, builds his dwelling in the barren tracts of the western country, and may often be seen sitting by the small mounds of earth, which indicate his abode, in an attitude of profound attention. Whole acres of land are occupied by these little tenants, and villages are found, containing thousands of inhabitants. Near the Rocky Mountains these villages are found to reach several miles. The burrow extends under ground, but to what distance has not been determined.

This Marmot, like the rest of the species, remains torpid during the winter. It is very much annoyed in its habitation by owls, rattle-snakes, lizards, and land tortoises, who appropriate these comfortable dwellings for their own use, and frequently destroy the young Marmots.

FRANKLIN'S MARMOT.

This animal is about the size of a rabbit, and is of a gray colour. It was first seen by Capt. Franklin near Fort Enterprise, in the British possessions in North America.

RICHARDSON'S MARMOT.

This animal, sometimes called the Tawny American Marmot, was found in the Hudson's Bay country by Franklin's expedition. It is nearly the size of the preceding species.

HOOD'S MARMOT.

This beautiful Marmot is found in the northern and western parts of America, and bears a strong resemblance to the striped squirrel, being marked with similar lines.

PARRY'S MARMOT.

This animal was named in honour of Captain Parry, and was found in the expedition under Captain Franklin. It is rather larger than Franklin's Marmot, has a broad flat body, and thick legs.

HOARY MARMOT, OR WHISTLER.

THIS animal inhabits the Rocky Mountains. It burrows in sandy soil, and may frequently be seen cutting hay, either for food or for its nest. While a party of them are employed in this way, if they are disturbed, the sentinel who sits near on an eminence, gives the alarm by a shrill whistle, which may be heard at a great distance, and is repeated from one Marmot to the other as far as their burrows extend.

The whistler feeds on roots and herbs, and is said to be about the size of a badger, and covered with silver-gray hair. The Indians take them in traps, and consider their flesh delicious food. They use their skins sewed together as blankets.

SHORT TAILED MARMOT.

THESE animals are found on the plains of the Columbia, and form burrows in immense numbers, sometimes covering two hundred acres of land. Each burrow contains ten or twelve inhabitants. They feed on the roots of grass.

THE AMERICAN SOUSLIK.

THIS animal resembles Parry's Marmot very closely in colour: its habits are not well known. It is found on the Rocky Mountains.

BEECHEY'S MARMOT.

THIS animal resembles Franklin's Marmot in colour, size and appearance. It is found in California, where it burrows in sandy plains in great numbers. Troops of them are often seen in fine weather, frolicking or feeding near their

habitations, to which they run on the slightest alarm
looking around, they frequently stand on their hind
When the weather is rainy, they do not appear
ground. They are very cleanly in their habits.

DOUGLAS' MARMOT.

This species is found on the banks of the Columbia R
and resembles the preceding in appearance. Littl
known of its habits.

SAY'S MARMOT.

This animal was first seen by Lewis and Clark, and
ranked among the squirrels by Godman, under the name
the Rocky Mountain ground squirrel. Richardson class
it among the Marmots. Its back is striped with brown an
white lines. It burrows in the ground, and is very abun
dant in the Rocky Mountains.

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stranger into it. All other animals of the deer kind are inconstant in their affection. The Roebuck never forsakes his mate; and, as they have been generally bred up together, the male and female form for each other the strongest attachment.

The female of this species goes with young five months and a half, and brings forth about the end of April, or the beginning of May. The hind goes more than eight months; and this is a circumstance which alone suffices to prove, that these animals are of a species so different, that they can never intermix, nor produce together an intermediate race. The female separates herself from the male, when she is about to bring forth, retiring into the thickest part of the woods, in order to avoid the wolf, which is her most dangerous enemy. At the expiration of about ten or twelve days, the Fawns, of which there are generally two at a birth, attain strength enough to follow her. when she is threatened with any peril, she hides them in some deep thicket, offers herself to the danger, and allows herself to be chased in their stead.

The Fawns continue to follow the Buck and the Doe eight or nine months in all; and, upon separating, their horns begin to appear, as those of the stag, the first year, simple, and without antlers. These they shed at the latter end of autumn, and renew during the winter.

In the stag, the fallow-deer, and the Roebuck, there are two bony eminences, on which their horns grow, which begin to shoot at the end of five or six months, and which, in a little time longer, arrive at their full growth; and far from enlarging themselves as the animal advances in age, they diminish, and are even the most certain index for discovering, every year, the advanced age of all the species.

As the female goes only five months and a half with

young, and as the growth of the young Roebuck is quicker than that of the young stag, so his life is shorter, and does not appear to extend beyond twelve or fifteen years, at the farthest. The Roebucks remain in winter in the thickest coppices, and live on briars, broom, heath, &c. In spring, they repair to the more open groves, and browse upon the buds and young fresh leaves of almost every tree; and this warm food, fermenting in their stomachs, inebriates them in such a manner, that they are then easily surprised.

The Roebuck is the smallest of the British deer. The species is now nearly extinct in England. They are somewhat more plentiful in the highlands of Scotland.

It appears that this species, which is not so numerous as that of the stag, and which is very seldom to be found in many parts of Europe, is much more abundant in America. There we hear only of two sorts, the red, which is the larger, and the brown, which is the smaller; and, as they are more commonly found in the northern than in the southern parts of that continent, so it may be presumed, that they differ more from each other there than they do in Europe. In Louisiana, for instance, they are extremely common, and much larger than in France; they are also found at Brazil; for the animal which is there denominated the *Cujuacuápara*, differs not from the European Roebuck more than the Canadian stag differs from the French stag.*

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* It is surprising at this late day to find respectable works on natural history, retaining such a passage as this. The Roebuck is found in no part of America, nor is there any animal that could well be mistaken for it. The animal referred to is evidently the common fallow deer, or Virginia deer. We shall have occasion to notice this subject more fully, in a subsequent part of this work.

CHAP. X.

Of Wild Animals.....The Hare....The Alpine Hare....The Ogotona Hare....The Calling Hare....The American Hare ....The Little Chief Hare....and the Rabbit.

THE HARE.

Those species of animals which are the most numerous, are not always the most useful; but the species of the Hare, and of the rabbit, are advantageous to us, both as to their number and their utility. Hares are universally and abundantly spread over the face of the whole earth; and rabbits, though they originated only in particular climates, do yet multiply so prodigiously in almost every place to which they are transported, that it is no longer possible to extirpate them, and no small art is required in order to diminish their number. Some species of Hares are migratory. They move, in flocks of five or six hundred, and often to a great distance, in search of food.

In those districts in England, which are reserved for the chase, four or five hundred Hares are killed in the course of perhaps one day's sport. These animals multiply amazingly; they are in a condition to engender in all seasons, and before the first year of their life is expired. The females do not go above thirty or thirty-one days with their young. They produce three or four, and, as soon as these are brought forth, are again ready to receive the male; they likewise receive him while they are pregnant, and, by a particular formation of their genitals, are often found to have a superfœtation.

The young ones are brought forth with their eyes open; the mother suckles them for the space of twenty days; after which they separate themselves from her, and provide for their own subsistence; they do not withdraw themselves far from each other, nor from the place where they first drew breath; yet they live in solitude, and each composes for itself a form, at a little distance, perhaps sixty or eighty paces. Thus when we find a young Leveret in one place, we are almost sure of finding one or two more in the neighbourhood. They feed more by night than by day; and their favourite articles of provision are, herbs, roots, leaves, fruit, and grain; but above all, such plants as yield a milky juice. They even eat the bark of trees in winter. When they are reared at home, they are fed with lettuce and roots; but the flesh of these domestic Hares is always of a bad flavour.

Hares sleep much, but always with their eyes open. They have no eyelashes, and seem to have but bad eyes. The eyes, however, are so prominent, that they can see both before and behind. Their hearing is exceedingly acute, and their ears are very large compared with the size of their body. They move these long ears with great facility, and use them as a helm, in order to direct their course, which is so rapid, that they easily outstrip all other animals. As their fore legs are much shorter than their hind legs, they can more easily ascend than descend; for which reason, when they are pursued, their first object is to gain, if possible, some mountain. Their motion in running is a kind of gallop; they proceed without making any noise, because their feet are plentifully covered with hair, even underneath; and perhaps they are the only animals which have hair growing within their mouths.

Hares live not above seven or eight years. They pass their lives in solitude and in silence; and never are known to exert their voice, but when they are forcibly laid hold of, tormented, or wounded. They are by no means so wild as by their habits might be supposed: they are gentle, and susceptible of a species of improvement. As they have a good ear, as they rest on their hind feet of their own accord, and use their fore legs like arms, some have been so tutored as to beat a drum, to gesticulate in cadence, &c.

Hares may be domesticated, and they then display sagacity, affection, and no small share of curiosity. Cowper, the poet, has given an amusing account of three of them, which he kept for some years:—"I undertook," says he, "the care of three, which it is necessary that I should here distinguish by the names I gave them—Puss, Tiney, and Bess. Notwithstanding the two feminine appellatives, I must inform you that they were all males. Immediately commencing carpenter, I built them houses to sleep in, each had a separate apartment, so contrived that their ordure should pass through the bottom of it; an earthen pan placed under each received whatever fell, which being duly emptied and washed, they were thus kept perfectly sweet and clean. In the day time they had the range of a hall, and at night retired each to his own bed; never intruding into that of another.

"Puss grew presently familiar, would leap into my lap, raise himself upon his hinder feet, and bite the hair from my temples. He would suffer me to take him up in my arms, and has more than once fallen fast asleep upon my knee. He was ill three days, during which time I nursed him, kept him apart from his fellows, that they might not molest him (for, like many other wild animals, they persecute one of their own species that is sick), and by constant care, and trying him with a variety of herbs, restored him to perfect health. No creature could be more grateful than my patient after his recovery; a sentiment which he most significantly expressed by licking my hand, first the back of it, then the palm, then every finger separately, then between all the fingers, as if anxious to leave no part of it unsaluted; a ceremony which he never performed but once again upon a similar occasion. Finding him extremely tractable, I made it my custom to carry him always after breakfast into my garden, where he hid himself generally under the leaves of a cucumber vine, sleeping or chewing the cud until evening; in the leaves also of that vine he found a favourite repast. I had not long habituated him to this taste of liberty, before he began to be impatient for the return of the time when he might enjoy it. He would invite me to the garden by drumming upon my knee, and by a look of such expression as it was not possible to misinterpret. If this rhetoric did not immediately succeed, he would take the skirt of my coat between his teeth, and pull at it with all his force. Thus Puss might be said to be perfectly tamed, the shyness of his nature was done away, and, on the whole, it was visible by many symptoms which I have not room to enumerate, that he was more happy in human society than when shut up with his natural companions.

"Not so Tiney; upon him the kindest treatment had not the least effect. He too was sick, and in his sickness had an equal share of my attention, but if, after his recovery, I took the liberty to stroke him, he would grunt, strike with his fore feet, spring forward, and bite. He was, however, very entertaining in his way; even his surliness was matter of mirth, and in his play he preserved such an air of gravity, and performed his feats with such a solemnity of manner, that in him too I had an agreeable companion.

"Bess, who died soon after he was full grown, and whose death was occasioned by his being turned into his box, which had been washed, while it was yet damp, was a Hare of great humor and drollery. Puss was tamed by gentle usage; Tiney was not to be tamed at all; and Bess had a courage and confidence that made him tame from the beginning. I always admitted them into the parlour after supper, when, the carpet affording their feet a firm hold, they would frisk, and bound, and play a thousand gambols, in which Bess, being remarkably strong and fearless, was always superior to the rest, and proved himself the Vestris of the party. One evening the cat, being in the room, had the hardiness to pat Bess upon the cheek, an indignity which he resented by drumming upon her back with such violence, that the cat was happy to escape from under his paws and hide herself.

"I describe these animals as having each a character of his own. Such they were in fact, and their countenances were so expressive of that character, that, when I looked only on the face of either, I immediately knew which it was. It is said that a shepherd, however numerous his flock, soon becomes so familiar with their features, that he can, by that indication only, distinguish each from all the rest; and yet, to a common observer, the difference is hardly perceptible. I doubt not that the same discrimination in the cast of countenances would be discernible in Hares, and am persuaded that among a thousand of them no two could be found exactly similar; a circumstance little suspected by those who have not had opportunity to observe it. These creatures have a singular sagacity in discovering the minutest alteration that is made in the place to which they are accustomed, and instantly apply their nose to the examination of a new object. A small hole being burnt in the carpet, it was mended with a patch, and that patch in a moment underwent the strictest scrutiny. They seem to be very much directed by the smell in the choice of their favourites: to some persons, though they saw them daily, they could never be reconciled, and would even scream when they attempted to touch them; but a miller coming in engaged their affections at once; his powdered coat had charms that were irresistible. It is no wonder that my intimate acquaintance with these specimens of the kind has taught me to hold the sportsman's amusement in abhorrence; he little knows what amiable creatures he persecutes, of what gratitude they are capable, how cheerful they are in their spirits, what enjoyment they have of life, and that impressed as they seem with a peculiar dread or man, it is only because man gives them peculiar cause for it.

"Bess, I have said, died young; Tiney lived to be nine years old, and died at last, I have reason to think, of some hurt in his loins by a fall; Puss is still living, and has just completed his tenth year, discovering no signs of decay, nor even of age, except that he is grown more discreet and less frolicsome than he was. I cannot conclude without observing, that I have lately introduced a dog to his acquaintance; a spaniel that had never seen a Hare, to a Hare that had never seen a spaniel. I did it with great caution, but there was no real need of it. Puss discovered no token of fear, nor Marquis the least symptom of hostility. There is, therefore, it should seem, no natural antipathy between dog and Hare, but the pursuit of the one occasions the flight of the other, and the dog pursues because he is trained to it; they eat bread at the same time out of the same hand, and are in all respects sociable and friendly.

"I should not do complete justice to my subject, did I not add, that they have no ill scent belonging to them that they are indefatigably nice in keeping themselves clean, for which purpose nature has furnished them with a brush under each foot; and that they are never infested by any vermin."*

In general, the Hare is not devoid of the instinct necessary for its preservation, nor of sagacity sufficient to effect an escape from its enemies. It prepares for itself a form; and in winter, it chooses a spot which is exposed to the South, as in summer it does one which is situated to the north. It hides itself from view among hillocks of earth which are of the same colour as its hair. "I have seen," says Du Fouilloux, "a Hare so cunning, that, as soon as it heard the huntsman's horn, it started from its form, and, though at the distance of a quarter of a league from it, leaped to a pond, and there hid itself among the rushes, and thus escaped the pursuit of the dogs. I have seen a Hare, which, after having run above two hours before the dogs, has dislodged another Hare, and taken possession of its form. I have seen others swim over three ponds, of which the smallest was not less than eighty paces broad. I have seen others, which, after having been warmly chased for two hours, have entered a sheep-cot, through the little opening under the door, and remained among the cattle. I have seen others, which, when the dogs have chased them, joined a flock of sheep in the field, and, in like manner, remained with them. I have seen others, which, when they heard the dogs, have concealed themselves in the earth. I have seen others, which have gone along one side of a hedge, and returned by the other; so that there was only the thickness of the hedge between the dogs and the Hare. I have seen others, which, after they had been chased for half an hour, have mounted an old wall of six feet high, and taken refuse in a hole covered with ivy."

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* Puss died of old age, when she was within a month of her twelfth year.

The nature of the soil has a great influence on these, as well as on all other animals; the Hares of the mountains are larger and fatter than those of the plains, and are also of a different colour; the former being browner on the body, and whiter about the neck than the latter, which are more inclined to red. On high mountains, and in the northern countries, they become white in the winter, and in summer recover their ordinary colour.

THE ALPINE HARE

Is about nine inches in length, with a long head and whiskers, short rounded ears, and a fur which, at first sight, seems of a bright uniform bay colour, but which, in reality, is dusky at the roots, bright bay at the ends, slightly tipped with white, and intermixed with long dusky hairs. It never resides in a more southerly latitude than the Altaic chain of mountains, near the lake of Baikal, and is found as far to the north as Kamtschatka. As the depth of the winter snow would prevent them from finding food, these Hares, in companies, collect, towards autumn, vast heaps of their favourite herbs, which they dry carefully, and form into round or conoid ricks. These ricks are generally three or four feet in diameter, and sometimes of the height of a man. The horses of the Sable hunters would often perish of famine, did not these ricks afford a timely supply.

THE OGOTONA HARE

Is of a pale brown above, and somewhat white beneath. It is rather more than six inches in length, and has no tail. This species inhabits all Mongolia, and beyond the lake Baikal. It burrows in the sandy soil, or lives under heaps of stones, and forms its nest of soft grass. Like the Alpine Hare, it collects a winter store of provisions.

THE CALLING HARE

Is a solitary animal, a native of Russia, and is still smaller than the Ogotona Hare. It has a soft, long, smooth fur, of a brownish lead colour, the hairs tipped with black. This kind of Hare is easily tamed, and is very good natured. Its voice, which is like the piping of a quail, may be heard at a great distance, and is repeated three, four, and often six times successively, at equal intervals.

THE AMERICAN HARE, IMPROPERLY CALLED RABBIT.

The American Hare is found throughout this country to as far north as the vicinity of Carlton House, in the Hudson's Bay country. According to the statement of Hearne, "they are not plentiful in the eastern parts of the northern Indian country, not even in those parts that are situated among the woods; but to the westward, bordering on the southern Indian country, they are in some places pretty numerous, though by no means equal to what has been reported of them at York Fort, and some other settlements in the Bay." In parts of the Union, this Hare is exceedingly common, and large numbers are annually destroyed for the sake of their flesh and fur.

During the day time the Hare remains crouched within its form, which is a mere space, of the size of the animal, upon the surface of the ground, cleared of grass, and sheltered by some overarching plant; or else its habitation is in the hollowed trunk of a tree, or under a collection of stones, &c.

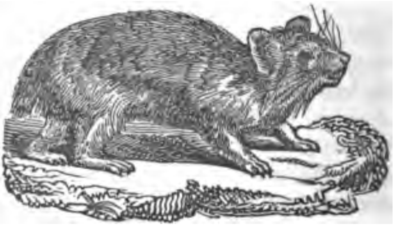
It is commonly at the earliest dawn, while the dewdrops still glitter on the herbage, or when the fresh verdure is concealed beneath a mantle of glistening frost, that the timorous Hare ventures forth in quest of food, or courses undisturbed over the plains. Occasionally during the day, in retired and little frequented parts of the country, an individual is seen to scud from the path, where it has been basking in the sun; but the best time for studying the habits of the animal is during moon-light nights, when the hare is to be seen sporting with companions in unconstrained gambols, frisking with delighted eagerness around its mate, or busily engaged in cropping its food. On such occasions the turnip and cabbage fields suffer severely, where these animals are numerous, though in general they are productive of serious injury. However, when the food is scarce, they do much mischief to the farmers, by destroying the bark on the young trees in the nurseries, and by cutting valuable plants.

The flesh of the American Hare, though of a dark colour, is much esteemed as an article of food. During the summer season they are lean and tough, and in many situations they are infested by a species of œtrus, which lays with eggs in their skins, producing worms of a considerable size. But in the autumnal season, and especially after the commencement of the frost, when the wild berries, &c. are ripe, they become very fat, and are a delicious article of food. In the north, during winter, they feed on the twigs of the pine and fir, and are fit for the table throughout the season. The Indians eat the contents of their stomachs, notwithstanding the food is such as we have just mentioned.

The American Hare never burrows in the ground like the common European rabbit. When confined in a yard, our animal has been known to attempt an escape by scratching a hole in the earth near the fence or wall; but there are few wild animals, whatever may be their characters, that will not do the same, under similar circumstances, though in their natural condition they may never attempt to burrow. Such is the fact in relation to the American hare, which never burrows while it is free tenant of the fields and woods. It has been said that this animal also occasionally ascends trees, which must be understood solely of its going up within the trunks of hollow trees, which it effects by pressing with its back and feet against opposite sides of the hollow, ascending somewhat in the same manner that a sweep climbs a chimney.

The Hare is not hunted in this country as in Europe, but is generally roused by a dog, and shot, or is caught in various traps and snares. In its movements our Hare closely resembles the common Hare of Europe, bounding along with great celerity, and would no doubt, when pursued, resort to the artifices of doubling, &c. so well known to be used by the European animal. The American Hare breeds several times during the year, and in the Southern States even during the winter months, having from two to four or six at a litter.

THE LITTLE CHIEF HARE.



This highly interesting animal inhabits the Rocky Mountains, from latitude 52° to 60°. Through the kindness of Mr. Macpherson, I obtained some specimens from the River of the Mountains, or south branch of the Mackenzie; and Mr. Drummond killed several near the source of the Elk River. There is likewise a good specimen in the museum of the Hudson's Bay Company.

Mr. Drummond informs me, that the Little Chief Hare frequents heaps of loose stones, through the interstices of which it makes its way with great facility. It is often seen at sunset, mounted on a stone, and calling to its mates by a peculiar shrill whistle. On the approach of a man, it utters a feeble cry, like the squeak of a rabbit when hurt, and instantly disappears, to reappear in a minute or two, at the distance of twenty or thirty yards, if the object of its apprehension remains stationary. On the least movement of the intruder, it instantly conceals itself again, repeating its cry of fear, which, when there are several of the animals in the same neighbourhood, is passed from one to the other. Mr. Drummond describes their cry as very deceptive, and as appearing to come from an animal at a great distance, whilst, in fact, the little creature is close at hand; and if seated on a gray limestone rock, its colour is so similar, that it can scarcely be discerned. These animals feed on vegetables. Mr. Drummond never found their burrows, and he thinks that they do not make any, but that they construct their nests amongst the stones. He does not know whether they store up hay for the winter or not, but is certain that they do not come abroad during that season.—*Richardson.*

THE POLAR HARE

INHABITS both sides of Baffin's Bay ; it does not dig burrows, but shelters itself among stones and rocks. In winter its fur is snow white, and resembles down—in summer it is gray.

THE PRAIRIE HARE

Is found from the plains of the Missouri to Lake Winnepeg. Its fur is thick, and of a pure white, except along the neck, where it is gray.

THE RABBIT.

Though the hare and the Rabbit are externally, as well as internally, very much alike, yet they form two distinct and separate species.

The fecundity of the Rabbit is even greater than that of the hare; and, without crediting what Wotton has advanced, that one pair only, being left together in an island, produced six thousand in one year, it is certain, that these creatures multiply so prodigiously in countries which are proper for the breed, that the earth cannot furnish them with subsistence: they destroy herbs, roots, grain, fruit, and even trees and shrubs; and, were it not for the use made in Europe of the dog and the ferret, they would reduce the country to a desert. In the reign of Augustus, they became such a nuisance to the Balearic Islands, that the inhabitants were under the necessity of petitioning the emperor to send a military force to destroy them. The Rabbit not only engenders and produces oftener than the hare, but it has more ways to escape from its enemies, and to avoid the sight of man.

This circumstance alone may suffice to prove that the Rabbit is superior to the hare in point of sagacity. Both are alike in their conformation, and both have it in their power to dig retreats for themselves. Both are timid to an excess; but the one, possessed of less art, is contented with forming a residence on the surface of the earth, where it remains continually exposed; while the other, by a more improved instinct, takes the trouble to dig into the earth, and there to make itself an asylum; and so true is it, that they act in this case from a kind of reason or reflection, that we never see the domestic Rabbit employed in the same work. Rabbits give the alarm to each other by thumping on the ground with one of their hind feet, which may be heard to a considerable distance.

The domestic Rabbits, like all other animals, vary in their colour: white, black, and gray belong properly to Nature. The black Rabbits are the most scarce.

These animals are able to engender and produce at the age of five or six months. It is asserted, that they commonly attach themselves to one particular female, and never quit her. She goes with young thirty or thirty-one days, and will produce five, six, and sometimes seven or eight at a birth. Like the doe-hare, she has a double matrix, and of consequence can have in her womb at the same time, two separate litters. It appears, however, that superfœtations are less frequent in this species than in that of the hare.

A few days before they bring forth, they dig a fresh burrow, not in a right line, but in a crooked direction, at the bottom of which they make an excavation; after which they tear a quantity of hair from their bellies, and make a kind of bed for the use of their little ones. For the first two days they never quit them: they never stir abroad, unless forced to do so from necessity, and return as soon as ever they have taken their nourishment. At this season they eat much and very quick; and thus they tend and suckle their young for more than six weeks. Till then the Buck does not know them, nor does he enter the burrow which the Doe has dug. Often, even when she quits it and leaves her little ones behind, she stops up the entry to it with earth, wet with her urine; but when they begin to venture to the edge of the hole, and to eat groundsel and other herbs which the Doe picks out for them, the Buck begins to know them, to take them between his paws, to endeavour to give a gloss to their hair, to lick their eyes; and all of them, in succession, partake equally of his cares.

A gentleman, who had amused himself with raising Rabbits for many years, has communicated the following remarks:—

"I began," said he, "with only one male and one female, the former white, the latter gray; and of their produce, which was very numerous, the greatest part were gray, a good number of them white, and of a mixed colour, and some few black. These animals seem to have a great respect for paternal authority; at least I judge so, from the great deference which all my Rabbits showed for their first ancestor, whom I can always easily distinguish by his whiteness, and who is indeed the only male of that colour which I have preserved. It was to no purpose that the family augmented; those which, in their turn, became fathers, were still subordinate to him. Whenever they fought, whether on account of their females, or concerning their food, their great progenitor would run to the place of dispute with all speed, as soon as he heard the noise. No sooner did they perceive him, than every thing was presently reduced to order; and if he surprised any one of them actually assaulting another, he used to separate him from the rest, and punish him upon the spot. Another proof of his dominion over all his posterity, is, that they were accustomed to return at a whistle: whenever I gave the signal, how distant soever they might be, this old one immediately put himself at their head; and though he came first, yet he made them all file off, and enter before him; nor would he go in till the last."

Though rabbits are found in America, they are not natives of it, but are descended from those which have been brought from Europe. The animal vulgarly called Rabbit in this country, is the American hare, which we have described.

CHAP. XI.

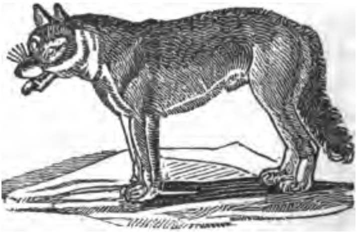
Of carnivorous Animals...The Wolf...The American Wolves...The American Foxes...The Badger...The American Badger...The Otter...The Sea Otter...The Mink...The Martin...The Pine Martin...The Pole Cat....The Skunk...The Ferret...The Weasel...The Ermine...The Sable.

Animals which have but one stomach, and whose intestines are short, are forced, like man, to feed on flesh. Of this affinity, and of this truth, we shall receive certain information by a relative comparison of the size of the intestinal canal in carnivorous animals, and in those that live solely on herbage. We shall then find, that the difference in their manner of living depends solely on the difference in their conformation, and that their nourishment is more or less solid, as the receptacle for it is more or less capacious.

Hence, however, it is not to be concluded, that those animals which live solely on herbage are, from physical necessity, as carnivorous animals are with respect to flesh, absolutely confined to one kind of sustenance. It is only to be understood, that those which have several stomachs, or very large intestines, may be supported without this substantial aliment so necessary to others. It is not meant, that they might not use it, or that if Nature had furnished them with arms, not only for the purposes of self-defence, but for those of attack and rapine, they would not have exerted them, and soon accustomed themselves to flesh and blood; since we find, that sheep, calves, goats, and horses, greedily eat milk and eggs, which are animal food, and that, unaided by custom, they do not refuse meat which has been hashed and seasoned with salt.

Without a violation of truth, then, it may be said, that the generally predominant appetite of animals is for flesh and other solid food, and that this appetite is more or less vehement, more or less moderate, according to the particular conformation of each animal; since, on taking a full view of Nature, we find it not only in man, but in quadruped animals, in fishes, and in worms, for which indeed all flesh seems to be particularly and ultimately destined.

THE WOLF



Is one of those animals whose appetite for animal food is the most vehement, and whose means of satisfying this appetite are the most various. Nature has furnished him with strength, with cunning, with agility, with all those requisites, in a word, which fit an animal for pursuing, overtaking, and conquering its prey; and yet, with all these, the Wolf most frequently dies of hunger; for he is the declared enemy of man. Being long proscribed, and a reward offered for his head, he is obliged to fly from the habitations of man, and to live in the forest, where the few wild animals to be found, escape him either by their swiftness or their art, or are supplied in too small a proportion to satisfy his rapacity. When pressed with hunger, however, he braves danger, and comes to attack those animals which are under the protection of man, particularly such as he can readily carry away, lambs, sheep, or even dogs themselves; for all animal food becomes then equally agreeable. If this excursion has succeeded, he often returns to the charge, till having been wounded, or closely pursued by the dogs or the shepherds, he hides himself by day in the thickest coverts, and, for a while, only ventures out at night; but, at last, when his necessities are very urgent, he boldly faces certain destruction: he attacks women and children, and sometimes ventures even to fall upon men; becomes furious by his continual agitations, and ends life in madness.

The Wolf, as well externally as internally, so nearly resembles the dog, that he seems modelled upon the same plan; and yet he only offers the reverse of the image. If his form be similar, his nature is different; and indeed they are so unlike in their dispositions, that no two animals can have a more perfect antipathy to each other. A young dog shudders at the sight of a Wolf; a dog who is stronger, and who knows his strength, bristles up at the sight, testifies his animosity, attacks him with courage, endeavours to put him to flight, and does all in his power to rid himself of a presence that is hateful to him. They never meet without either flying from, or fighting with each other. If the Wolf is the stronger, he tears and devours his prey: the dog, on the contrary, is more generous and contents himself with his victory.

The dog, even in his savage state, is not cruel; he is easily tamed, and continues firmly attached to his master. The Wolf, when taken young, becomes tame, but never has an attachment.* Nature is stronger in him than education; he resumes, with age, his natural dispositions, and returns, as soon as he can, to the woods whence he was taken. Dogs, even of the dullest kinds, seek the company of other animals; they are naturally disposed to follow and accompany other creatures: the Wolf, on the contrary, is the enemy of all society; he does not even keep much company with those of his kind. When they are seen in packs together, it is not to be considered as a peaceful society, but a combination for war: they testify their hostile intentions by their loud howlings, and by their fierceness discover a project for attacking some great ani-

mal, such as a stag or a bull, or for destroying some formidable dog. The instant their military expedition is completed, their society is at an end; they then part, and each returns in silence to his solitary retreat. There is not even any strong attachment between the male and female; they seek each other only once a year, and remain but a few days together.

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The difference in the duration of the pregnancy of the she Wolf, who goes with young above a hundred days, and the bitch, who does not go above sixty, proves, that the Wolf and the dog, so different in disposition, are still more so in one of the principal functions of the animal economy.

The Wolf generally brings forth five or six, and sometimes even nine at a litter. The Cubs are brought forth, like those of the bitch, with the eyes closed. The dam suckles them for some weeks, and teaches them betimes to eat flesh, which she prepares for them, by chewing it first herself. They do not leave the den where they have been littered, till they are six weeks or two months old. It is not, however, till they are about ten or twelve months old, and till they have shed their first teeth and completed the new, that the dam thinks them in a capacity to shift for themselves. Then, when they have acquired arms from Nature, and have learned industry and courage from her example, she declines all future care of them, being again engaged in bringing up a new progeny. These animals require two or three years for their growth, and live to the age of fifteen or twenty.

The Wolf grows gray as he grows old, and his teeth wear, like those of most other animals, by using. He sleeps when his belly is full, or when he is fatigued, rather by day than night, and is always very easily waked. He drinks frequently; and in times of drought, when there is no

water to be found in the trunks of old trees, or in the pools about the forest, he comes often, in the day, down to brooks or lakes in the plain. Although very voracious, he yet supports hunger for a long time, and often lives four or five days without food, provided he is supplied with water.

The Wolf has great strength, particularly in his fore parts, in the muscles of his neck and jaws. He carries off a sheep in his mouth without letting it touch the ground. and runs with it much swifter than the shepherds who pursue him, so that nothing but the dogs can overtake him, or oblige him to quit his prey. He bites cruelly, and always with greater vehemence in proportion as he is less resisted; for he uses precautions with such animals as attempt to stand upon the defensive. He is cowardly, and never fights but when under a necessity of satisfying his hunger, or of making good his retreat. When he is wounded by a bullet, he is heard to cry out; and yet when surrounded by the peasants, and attacked with clubs. he never howls, but defends himself in silence, and dies as hard as he lived.

If he happens to be caught in a pit-fall, he is for some time so frightened and astonished, that he may be killed without offering to resist, or taken alive without much danger. At that instant, one may clap a collar round his neck, muzzle him, and drag him along, without his even giving the least signs of anger or resentment. At all other times, he has his senses in great perfection. He smells a carcass at the distance of more than a league; he also perceives living animals a great way off, and follows them a long time upon the scent. Whenever he leaves the wood, he always takes care to go out against the wind. When just come to its extremity, he stops to examine, by its smell, on all sides, the emanations that may come either

from his enemy or his prey, which he very nicely distinguishes. He prefers those animals which he himself kills to those he finds dead; and yet he does not disdain these, though ever so much infected, when no better is to be had. He is particularly fond of human flesh; and, perhaps, if he was sufficiently powerful, he would eat no other. Wolves have been seen following armies, and arriving in numbers upon the field of battle, where they devoured such dead bodies as were left upon the field, or but negligently interred. These, when once accustomed to human flesh, ever after seek particularly to attack mankind, choose to fall upon the shepherd rather than his flock, and devour women, carry off their children, &c. These dreadful Wolves are called *ware-wolves*, that is to say, Wolves of which we ought to be *aware.*[*]

The Wolf was early extirpated in England. Nothing is heard of them subsequently to the reign of Edward I. They stood their ground, however, much longer in Scotland and Ireland. The last Scotch Wolf is said to have fallen in Lochaber, late in the seventeenth century, by the hand of Sir Ewen Cameron. In Ireland they were not extirpated till the beginning of the eighteenth century.

The colour of this animal differs according to the different climates in which he is bred, and often changes even in the same country. Besides the common Wolves which are found in France and Germany, there are others with thicker hair, inclining to yellow. In the northern climates,

some are found quite black, and [illegible] white all over. The former are larger and stronger than those of any other kind.

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[*] This is a mistake. The word and the definition are both wrong; and the latter has the additional demerit of being absurd. There is no species of Wolf of which it is unnecessary to be aware. The word is derived from the Saxon. It is *were-wolf, i. e.* man-wolf, from a very ancient superstition that sorcerers sometimes changed themselves into Wolves. The Greeks also had their lycanthropos, or man-wolf. ED.

THE CLOUDED BLACK WOLF.*

This animal is a native of the extreme northern regions of America. It is a much nobler looking creature than the common species, and is also much larger and more robust. The ears are remarkably short, and the tail is shorter in proportion than that of the Wolf. The hair is mottled with various shades of black, gray, and white, and is of considerable length, particularly along the middle of the back and shoulders, where it forms a sort of ill-defined mane. On the sides the colouring is somewhat lighter, and is of a still lighter shade beneath. From the top of the nose to the origin of the tail, this animal measures about four feet and a quarter. Its ferocity remains undiminished by protracted confinement.

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* Two specimens of this animal are now in the Tower Menagerie of London; it is probably one of the varieties hereafter noticed.

THE WOLF.

When the aboriginal Americans first gave place to European adventurers, and the forests, which had flourished for ages undisturbed, began to fall before the unsparing axe, the vicinity of the settler's lonely cabin resounded with the nightly howling of Wolves, attracted by the refuse provision usually to be found there, or by a disposition to prey upon domestic animals. During winter, when food was most difficult to be procured, packs of these famished and ferocious creatures were ever at hand, to run down and destroy any domestic animal found wandering beyond the enclosures, which their individual or combined efforts could overcome, and the boldest house-dog could not venture far from the door of his master without incurring the risk of being killed and devoured. The common Wolf was then to be found in considerable numbers throughout a great extent, if not the whole of North America; at present it is only known as a resident of the remote wooded and mountainous districts, where man has not fixed his abode, nor laid bare the bosom of the earth to the enlivening radiance of the sun.

The common Wolf of America is considered to be the same species as the Wolf of Europe, and, in regard to habits and manners, gives every evidence of such an identity.*

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* Richardson remarks that he has travelled over 30 degrees of latitude in America, and has never seen there any Wolves which had the gaunt appearance, the comparatively long jaw and tapering nose, the high ears, long legs, slender loins, and narrow feet of the Pyrenean Wolf. He adds that the American animal has a more robust form than the European Wolf. Its muzzle is thicker and more obtuse, its head larger and rounder, and there is a sensible depression at the union of the nose and forehead. He notices six varieties of the Wolf in

Like all the wild animals of the dog kind, they unite in packs to hunt down animals which individually they could not master, and during their sexual season, engage in the most furious combats with each other for the possession of the females.

In the regions west of Hudson's Bay, Wolves are often seen, both in the woods and on the plains, though their numbers are inconsiderable, and it is not common to see more than three or four in a pack. They appear to be very fearful of the human race, but are destructive to the Indian dogs, and frequently succeed in killing such as are heavily laden, and unable to keep up with the rest. The males are not so swift as the females; and they seem to lead a forlorn life during the winter, being seldom seen in pairs until the commencement of spring. They bring forth their young in burrows, and though it might well be inferred that they are fiercer at those times, than under ordinary circumstances, yet Hearne states that he has frequently seen the Indians take the young ones from the dens and play with them. They never hurt the young Wolves, but always replace them in their dens, sometimes painting the faces of these whelps with vermilion or red ochre.

At the highest northern latitudes which have yet been explored, the Wolves are very numerous and very audacious. They are generally to be found at no great distance from the huts of the Esquimaux, and follow these people from place to place, being apparently very much

North America :—Common Gray Wolf, White, Pied, Dusky, Black, and Prairie.

There is little reason to doubt that all the Wolves of America are of one species; and the variations of size, color, and habits, are to be referred to diversities of climate which have been gradually impressed upon these animals.

dependent upon them for food, during the coldest season of the year. They are frequently seen in packs of twelve or more, prowling about at a short distance from the huts of the Esquimaux, lying in wait for the Esquimaux dog, which they are successful in killing if he wanders so far as to be out of reach of assistance from his master. In one instance, two of them rushed upon a fine Newfoundland dog belonging to Captain Lyon, in the day time, and would have killed him but for the timely interference of his master. Capt. Lyon relates the following singular instance of the cunning of one of these wolves which had been caught in a trap, and, after being to all appearance dead, was dragged on board the ship; 'The eyes, however, were observed to wink, whenever any object was placed near them; some precautions were therefore considered necessary, and the legs being tied, the animal was hoisted up with his head downwards. He then, to our surprise, made a vigorous spring at those near him, and afterwards repeatedly turned himself upwards, so as to reach the rope by which he was suspended, endeavouring to gnaw it asunder, and making angry snaps at the persons who prevented him. Several heavy blows were struck on the back of his neck and a bayonet was thrust through him, yet above a quarter of an hour elapsed before he died, having completely convinced us that for the future we should not too easily trust to the appearance of death in animals of this description.

Godman.

COMMON GRAY WOLF OF AMERICA.

THIS animal is very dissimilar in colour to the usual state of the European Wolf, and is of a much greater size. The teeth are remarkably strong and large; the ears sharp and erect, thickly clothed with dark brown hair, and tipped with gray.—*Richardson.*

PRAIRIE OR BARKING WOLF.

THIS Wolf frequents the prairies or natural meadows of the west, where troops or packs containing a considerable number of individuals are frequently seen following in the train of a herd of buffalo or deer, for the purpose of preying on such as may die from disease, or in consequence of wounds inflicted by the hunters. At night they also approach the encampment of travellers, whom they sometimes follow for the sake of the carcasses of animals which are relinquished, and, by their discordant howlings close to the tents, effectually banish sleep from those who are unaccustomed to their noise. According to Say's observation, they are more numerous than any of the other Wolves which are found in North America.

The barking Wolf closely resembles the domestic dog of the Indians in appearance, and is remarkably active and intelligent. Like the common Wolf, the individuals of this species frequently unite to run down deer, or a buffalo calf which has been separated from the herd, though it requires the fullest exercise of all their speed, sagacity and strength to succeed in this chase: They are very often

exposed to great distress from want of food, and in this state of famine are under the necessity of filling their stomachs with wild plums, or other fruits no less indigestible, in order to allay in some degree the inordinate sensations of hunger.

In confirmation of the sagacity of this Wolf we shall quote from Say, to whom we owe all that has yet been made known on this species, some anecdotes respecting it. "Mr Peale constructed and tried various kinds of traps to take them, one of which was of the description called a 'live trap,' a shallow box reversed and supported at one end by the well-known kind of trapsticks usually called the 'figure four,' which elevated the front of the trap upwards of three feet above its slab flooring; the trap was about six feet long, and nearly the same in breadth, and was plentifully baited with offal. Notwithstanding this arrangement a wolf actually burrowed under the flooring, and pulled down the bait through the crevices of the floor: tracks of different size were observed about the trap. This procedure would seem to be the result of a faculty beyond mere instinct.

"This trap proving useless, another was constructed in a different part of the country, formed like a large cage, through which the animals might enter but not return; this was equally unsuccessful; the Wolves attempted in vain to get at the bait, as they would not enter by the route prepared for them. A large double 'steel trap' was next tried; this was profusely baited, and the whole with the exception of the bait was carefully concealed beneath the fallen leaves. This was also unsuccessful. Tracks of the anticipated victims were next day observed to be impressed in numbers on the earth near the spot, but still the trap with its seductive charge remained untouched. The bait was then removed from the trap, and suspended over it

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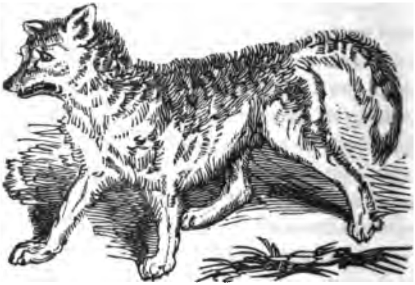

THIS Wolf frequents the prairies or natural meadows of the west, where troops or packs containing a considerable number of individuals are frequently seen following in the train of a herd of buffalo or deer, for the purpose of preying on such as may die from disease, or in consequence of wounds inflicted by the hunters. At night they also approach the encampment of travellers, whom they sometimes follow for the sake of the carcasses of animals which are relinquished, and, by their discordant howlings close to the tents, effectually banish sleep from those who are unaccustomed to their noise. According to Say's observation, they are more numerous than any of the other Wolves which are found in North America.

The barking Wolf closely resembles the domestic dog of the Indians in appearance, and is remarkably active and intelligent. Like the common Wolf, the individuals of this species frequently unite to run down deer, or a buffalo calf which has been separated from the herd, though it requires the fullest exercise of all their speed, sagacity and strength to succeed in this chase; They are very often

exposed to great distress from want of food; and in this state of famine are under the necessity of filling their stomachs with wild plums, or other fruits no less indigestible, in order to allay in some degree the inordinate sensations of hunger.

In confirmation of the sagacity of this Wolf we shall quote from Say, to whom we owe all that has yet been made known on this species, some anecdotes respecting it. "Mr Peale constructed and tried various kinds of traps to take them, one of which was of the description called a 'live trap,' a shallow box reversed and supported at one end by the well-known kind of trapsticks usually called the 'figure four,' which elevated the front of the trap upwards of three feet above its slab flooring; the trap was about six feet long, and nearly the same in breadth, and was plentifully baited with offal. Notwithstanding this arrangement a wolf actually burrowed under the flooring, and pulled down the bait through the crevices of the floor: tracks of different size were observed about the trap. This procedure would seem to be the result of a faculty beyond mere instinct.

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The difference in the duration of the pregnancy of the she Wolf, who goes with young above a hundred days, and the bitch, who does not go above sixty, proves, that the Wolf and the dog, so different in disposition, are still more so in one of the principal functions of the animal economy.

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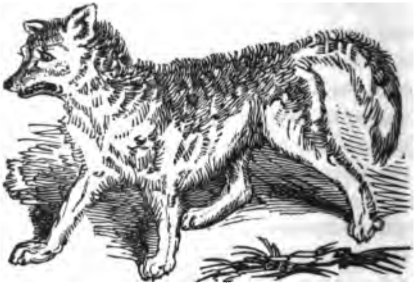

This Wolf frequents the prairies or natural meadows of the west, where troops or packs containing a considerable number of individuals are frequently seen following in the train of a herd of buffalo or deer, for the purpose of preying on such as may die from disease, or in consequence of wounds inflicted by the hunters. At night they also approach the encampment of travellers, whom they sometimes follow for the sake of the carcasses of animals which are relinquished, and, by their discordant howlings close to the tents, effectually banish sleep from those who are unaccustomed to their noise. According to Say's observation, they are more numerous than any of the other Wolves which are found in North America.

The barking Wolf closely resembles the domestic dog of the Indians in appearance, and is remarkably active and intelligent. Like the common Wolf, the individuals of this species frequently unite to run down deer, or a buffalo calf which has been separated from the herd, though it requires the fullest exercise of all their speed, sagacity and strength to succeed in this chase: They are very often

exposed to great distress from want of food, and in this state of famine are under the necessity of filling their stomachs with wild plums, or other fruits no less indigestible, in order to allay in some degree the inordinate sensations of hunger.

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The dog, even in his savage state, is not cruel; he is easily tamed, and continues firmly attached to his master. The Wolf, when taken young, becomes tame, but never has an attachment.* Nature is stronger in him than education; he resumes, with age, his natural dispositions, and returns, as soon as he can, to the woods whence he was taken. Dogs, even of the dullest kinds, seek the company of other animals; they are naturally disposed to follow and accompany other creatures: the Wolf, on the contrary, is the enemy of all society; he does not even keep much company with those of his kind. When they are seen in packs together, it is not to be considered as a peaceful society, but a combination for war: they testify their hostile intentions by their loud howlings, and by their fierceness discover a project for attacking some great ani-

mal, such as a stag or a bull, or for destroying some formidable dog. The instant their military expedition is completed, their society is at an end; they then part, and each returns in silence to his solitary retreat. There is not even any strong attachment between the male and female; they seek each other only once a year, and remain but a few days together.

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* This, like most sweeping assertions, affirms too much. M. Frederick Cuvier gives a remarkable instance in which a Wolf manifested for his master all the devoted attachment of a dog. The gentleman who brought him up from a puppy, and who was going to travel, presented him to the Paris Menagerie when he was full grown. For several weeks the Wolf was inconsolable; but at length he contracted new attachments with those about him, and seemed to have fotgotten his former owner. At the end of eighteen months, however, that owner returned, and, as soon as the Wolf heard the well known voice in the gardens of the Menagerie, he displayed the most violent joy, and, on being set at liberty, he hastened to his friend. An absence of three years next took place, and the Wolf was again disconsolate. The master once more returned, and though, it being evening, the Wolf's den was shut up, yet the moment the tones of his friend met his ear, he uttered the most anxious cries. On the door being opened, he darted towards the long absent person, leaped upon his shoulders, licked his face, and threatened to bite the keepers when they attempted to separate them. When the man left him, he fell sick, rejected all food, was long on the verge of death, and would thenceforth never suffer a stranger to approach him. ED.

The difference in the duration of the pregnancy of the she Wolf, who goes with young above a hundred days, and the bitch, who does not go above sixty, proves, that the Wolf and the dog, so different in disposition, are still more so in one of the principal functions of the animal economy.

The Wolf generally brings forth five or six, and sometimes even nine at a litter. The Cubs are brought forth, like those of the bitch, with the eyes closed. The dam suckles them for some weeks, and teaches them betimes to eat flesh, which she prepares for them, by chewing it first herself. They do not leave the den where they have been littered, till they are six weeks or two months old. It is not, however, till they are about ten or twelve months old, and till they have shed their first teeth and completed the new, that the dam thinks them in a capacity to shift for themselves. Then, when they have acquired arms from Nature, and have learned industry and courage from her example, she declines all future care of them, being again engaged in bringing up a new progeny. These animals require two or three years for their growth, and live to the age of fifteen or twenty.

The Wolf grows gray as he grows old, and his teeth wear, like those of most other animals, by using. He sleeps when his belly is full, or when he is fatigued, rather by day than night, and is always very easily waked. He drinks frequently; and in times of drought, when there is no

water to be found in the trunks of old trees, or in the pools about the forest, he comes often, in the day, down to brooks or lakes in the plain. Although very voracious, he yet supports hunger for a long time, and often lives four or five days without food, provided he is supplied with water.

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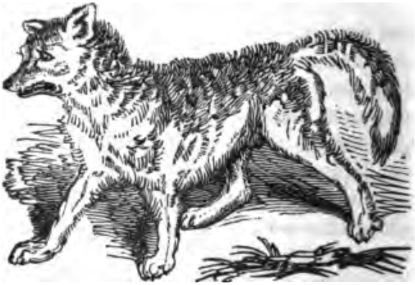

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from the branch of a tree; several pieces of meat were also suspended in a similar manner from trees in the vicinity. The following morning the bait over the trap alone remained. Supposing that their exquisite sense of smell warned them of the position of the trap, it was removed and then covered with leaves, and the baits being disposed as before, the leaves to a considerable distance around were burned; and the trap remained perfectly concealed by ashes; still the bait over the trap was avoided. It was not until a log trap was used that an individual of this species was caught. This log trap is made by raising one log above another at one end by means of an upright stick, which rests upon a rounded horizontal trigger on the lower log."—*Godman.*

PIED WOLF.

Wolves having black colours instead of gray, distributed in large patches on the side, are sometimes seen in the fur countries, associated with the common gray Wolf. On the banks of the Mackenzie I saw five young Wolves leaping and tumbling over each other, with all the playfulness of the puppies of the domestic dog, and it is not improbable that they were all of one litter. One of them was pied, another entirely black, and the rest showed the common gray colours.—*Richardson.*

THE DUSKY WOLF.

This Wolf is more robust in form, and fiercer and more formidable in appearance than either of those we have described. It is found in the Missouri country, frequenting the same districts as the prairie or barking Wolf, but is by no means in equal numbers. It is distinguished from the common Wolf by the length of its ears and tail, while it is separated from the barking Wolf by its greatly superior

size, difference of colour, &c. But little is known of the peculiar habits of this species, though there is no reason for believing that they differ much from those of its kindred species or varieties. It is remarkable for diffusing a strong and disagreeable odor.—*Godman.*

THE BLACK WOLF.

The Black Wolf has been found in the Missouri country, and the British possessions in North America, but not in such numbers as either of the foregoing species. It is not yet satisfactorily established that this Wolf is precisely of the same species as the European Black Wolf, whose scientific name is applied to it. Desmarest is much inclined to think it a new species, and it is most probable that a close comparison of the two will show differences between them, supporting his opinion.—*Godman.*

WHITE WOLF.

Wolves totally white are not uncommon in the most Northern parts of America, particularly in districts nearly destitute of wood. They are occasionally seen also on the plains of the Missouri.—*Richardson.*

THE FOX.

This animal has always been famous for his artifices; and the reputation he has thus acquired, he partly

water to be found in the trunks of old trees, or in the pools about the forest, he comes often, in the day, down to brooks or lakes in the plain. Although very voracious, he yet supports hunger for a long time, and often lives four or five days without food, provided he is supplied with water.

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from his enemy or his prey, which he very nicely distinguishes. He prefers those animals which he himself kills to those he finds dead; and yet he does not disdain these, though ever so much infected, when no better is to be had. He is particularly fond of human flesh; and, perhaps, if he was sufficiently powerful, he would eat no other. Wolves have been seen following armies, and arriving in numbers upon the field of battle, where they devoured such dead bodies as were left upon the field, or but negligently interred. These, when once accustomed to human flesh, ever after seek particularly to attack mankind, choose to fall upon the shepherd rather than his flock, and devour women, carry off their children, &c. These dreadful Wolves are called *ware-wolves*, that is to say, Wolves of which we ought to be *aware*.*

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The colour of this animal differs according to the different climates in which he is bred, and often changes even in the same country. Besides the common Wolves which are found in France and Germany, there are others with hicker hair, inclining to yellow. In the northern climates, some are found quite black, and some white all over. The former are larger and stronger than those of any other kind.

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* This is a mistake. The word and the definition are both wrong; nd the latter has the additional demerit of being absurd. There is o species of Wolf of which it is unnecessary to be aware. The word s derived from the Saxon. It is *were-wolf*, *i. e.* man-wolf, from a ery ancient superstition that sorcerers sometimes changed themselves nto Wolves. The Greeks also had their lycanthropos, or manvolf. ED.

THE CLOUDED BLACK WOLF.*

This animal is a native of the extreme northern regions of America. It is a much nobler looking creature than the common species, and is also much larger and more robust. The ears are remarkably short, and the tail is shorter in proportion than that of the Wolf. The hair is mottled with various shades of black, gray, and white, and is of considerable length, particularly along the middle of the back and shoulders, where it forms a sort of ill-defined mane. On the sides the colouring is somewhat lighter, and is of a still lighter shade beneath. From the top of the nose to the origin of the tail, this animal measures about four feet and a quarter. Its ferocity remains undiminished by protracted confinement.

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* Two specimens of this animal are now in the Tower Menagerie of London; it is probably one of the varieties hereafter noticed.

THE WOLF.

When the aboriginal Americans first gave place to European adventurers, and the forests, which had flourished for ages undisturbed, began to fall before the unsparing axe, the vicinity of the settler's lonely cabin resounded with the nightly howling of Wolves, attracted by the refuse provision usually to be found there, or by a disposition to prey upon domestic animals. During winter, when food was most difficult to be procured, packs of these famished and ferocious creatures were ever at hand, to run down and destroy any domestic animal found wandering beyond the enclosures, which their individual or combined efforts could overcome, and the boldest house-dog could not venture far from the door of his master without incurring the risk of being killed and devoured. The common Wolf was then to be found in considerable numbers throughout a great extent, if not the whole of North America; at present it is only known as a resident of the remote wooded and mountainous districts, where man has not fixed his abode, nor laid bare the bosom of the earth to the enlivening radiance of the sun.

The common Wolf of America is considered to be the same species as the Wolf of Europe, and, in regard to habits and manners, gives every evidence of such an identity.*

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* Richardson remarks that he has travelled over 30 degrees of latitude in America, and has never seen there any Wolves which had the gaunt appearance, the comparatively long jaw and tapering nose, the high ears, long legs, slender loins, and narrow feet of the Pyrenean Wolf. He adds that the American animal has a more robust form than the European Wolf. Its muzzle is thicker and more obtuse, its head larger and rounder, and there is a sensible depression at the union of the nose and forehead. He notices six varieties of the Wolf in

Like all the wild animals of the dog kind, they unite in packs to hunt down animals which individually they could not master, and during their sexual season, engage in the most furious combats with each other for the possession of the females.

In the regions west of Hudson's Bay, Wolves are often seen, both in the woods and on the plains, though their numbers are inconsiderable, and it is not common to see more than three or four in a pack. They appear to be very fearful of the human race, but are destructive to the Indian dogs, and frequently succeed in killing such as are heavily laden, and unable to keep up with the rest. The males are not so swift as the females; and they seem to lead a forlorn life during the winter, being seldom seen in pairs until the commencement of spring. They bring forth their young in burrows, and though it might well be inferred that they are fiercer at those times, than under ordinary circumstances, yet Hearne states that he has frequently seen the Indians take the young ones from the dens and play with them. They never hurt the young Wolves, but always replace them in their dens, sometimes painting the faces of these whelps with vermilion or red ochre.

At the highest northern latitudes which have yet been explored, the Wolves are very numerous and very audacious. They are generally to be found at no great distance from the huts of the Esquimaux, and follow these people from place to place, being apparently very much

North America:—Common Gray Wolf, White, Pied, Dusky, Black, and Prairie.

There is little reason to doubt that all the Wolves of America are of one species; and the variations of size, color, and habits, are to be referred to diversities of climate which have been gradually impressed upon these animals.

dependent upon them for food, during the coldest season of the year. They are frequently seen in packs of twelve or more, prowling about at a short distance from the huts of the Esquimaux, lying in wait for the Esquimaux dog, which they are successful in killing if he wanders so far as to be out of reach of assistance from his master. In one instance, two of them rushed upon a fine Newfoundland dog belonging to Captain Lyon, in the day time, and would have killed him but for the timely interference of his master. Capt. Lyon relates the following singular instance of the cunning of one of these wolves which had been caught in a trap, and, after being to all appearance dead, was dragged on board the ship; 'The eyes, however, were observed to wink, whenever any object was placed near them; some precautions were therefore considered necessary, and the legs being tied, the animal was hoisted up with his head downwards. He then, to our surprise, made a vigorous spring at those near him, and afterwards repeatedly turned himself upwards, so as to reach the rope by which he was suspended, endeavouring to gnaw it asunder, and making angry snaps at the persons who prevented him. Several heavy blows were struck on the back of his neck and a bayonet was thrust through him, yet above a quarter of an hour elapsed before he died, having completely convinced us that for the future we should not too easily trust to the appearance of death in animals of this description.

Godman.

COMMON GRAY WOLF OF AMERICA.

THIS animal is very dissimilar in colour to the usual state of the European Wolf, and is of a much greater size. The teeth are remarkably strong and large; the ears sharp and erect, thickly clothed with dark brown hair, and tipped with gray.—*Richardson.*

PRAIRIE OR BARKING WOLF.

THIS Wolf frequents the prairies or natural meadows of the west, where troops or packs containing a considerable number of individuals are frequently seen following in the train of a herd of buffalo or deer, for the purpose of preying on such as may die from disease, or in consequence of wounds inflicted by the hunters. At night they also approach the encampment of travellers, whom they sometimes follow for the sake of the carcasses of animals which are relinquished, and, by their discordant howlings close to the tents, effectually banish sleep from those who are unaccustomed to their noise. According to Say's observation, they are more numerous than any of the other Wolves which are found in North America.

The barking Wolf closely resembles the domestic dog of the Indians in appearance, and is remarkably active and intelligent. Like the common Wolf, the individuals of this species frequently unite to run down deer, or a buffalo calf which has been separated from the herd, though it requires the fullest exercise of all their speed, sagacity and strength to succeed in this chase; They are very often

exposed to great distress from want of food; and in this state of famine are under the necessity of filling their stomachs with wild plums, or other fruits no less indigestible, in order to allay in some degree the inordinate sensations of hunger.

In confirmation of the sagacity of this Wolf we shall quote from Say, to whom we owe all that has yet been made known on this species, some anecdotes respecting it. "Mr Peale constructed and tried various kinds of traps to take them, one of which was of the description called a 'live trap,' a shallow box reversed and supported at one end by the well-known kind of trapsticks usually called the 'figure four,' which elevated the front of the trap upwards of three feet above its slab flooring; the trap was about six feet long, and nearly the same in breadth, and was plentifully baited with offal. Notwithstanding this arrangement a wolf actually burrowed under the flooring, and pulled down the bait through the crevices of the floor: tracks of different size were observed about the trap. This procedure would seem to be the result of a faculty beyond mere instinct.

"This trap proving useless, another was constructed in a different part of the country, formed like a large cage, through which the animals might enter but not return; this was equally unsuccessful; the Wolves attempted in vain to get at the bait, as they would not enter by the route prepared for them. A large double 'steel trap' was next tried; this was profusely baited, and the whole with the exception of the bait was carefully concealed beneath the fallen leaves. This was also unsuccessful. Tracks of the anticipated victims were next day observed to be impressed in numbers on the earth near the spot, but still the trap with its seductive charge remained untouched. The bait was then removed from the trap, and suspended over it

from the branch of a tree; several pieces of meat were also suspended in a similar manner from trees in the vicinity. The following morning the bait over the trap alone remained. Supposing that their exquisite sense of smell warned them of the position of the trap, it was removed and then covered with leaves, and the baits being disposed as before, the leaves to a considerable distance around were burned; and the trap remained perfectly concealed by ashes; still the bait over the trap was avoided. It was not until a log trap was used that an individual of this species was caught. This log trap is made by raising one log above another at one end by means of an upright stick, which rests upon a rounded horizontal trigger on the lower log."—*Godman.*

PIED WOLF.

Wolves having black colours instead of gray, distributed in large patches on the side, are sometimes seen in the fur countries, associated with the common gray Wolf. On the banks of the Mackenzie I saw five young Wolves leaping and tumbling over each other, with all the playfulness of the puppies of the domestic dog, and it is not improbable that they were all of one litter. One of them was pied, another entirely black, and the rest showed the common gray colours.—*Richardson.*

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size, difference of colour, &c. But little is known of the peculiar habits of this species, though there is no reason for believing that they differ much from those of its kindred species or varieties. It is remarkable for diffusing a strong and disagreeable odor.—*Godman.*

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THE Black Wolf has been found in the Missouri country, and the British possessions in North America, but not in such numbers as either of the foregoing species. It is not yet satisfactorily established that this Wolf is precisely of the same species as the European Black Wolf, whose scientific name is applied to it. Desmarest is much inclined to think it a new species, and it is most probable that a close comparison of the two will show differences between them, supporting his opinion.—*Godman.*

WHITE WOLF.

WOLVES totally white are not uncommon in the most Northern parts of America, particularly in districts nearly destitute of wood. They are occasionally seen also on the plains of the Missouri.—*Richardson.*

THE FOX.

THIS animal has always been famous for his artifices; and the reputation he has thus acquired, he partly

merits. What the wolf cannot accomplish but by his superior strength, the Fox accomplishes by his superior cunning. Without attempting to oppose either the shepherd, his dog, or his flock, he finds an easier way to subsist. Patient and prudent, he waits the opportunity for depredation, and varies his conduct as he perceives that circumstances vary; and though as indefatigable as the wolf, and more nimble than that animal, he yet does not trust entirely to the swiftness of his course, but contrives for himself an asylum, to which he retires in cases of necessity, and in which, sheltered from danger, he brings up his young.

The Fox generally fixes his residence at the edge of a wood, and yet not far removed from some cottage or some hamlet. He listens to the crowing of the cock, and the cackling of other domestic fowls: even at a considerable distance he scents them, and seizes his opportunity. If he be able to get into the yard, he begins by levelling all the poultry without remorse. This done, he carries off a part of the spoil, hides it at some convenient distance, and again returns to the charge. Taking off another fowl in the same manner, he hides that also, though not in the same place; and this method he practises for several times together, till warned by the approach of day or the noise of the family, he finally retires. The same arts are observed when he finds birds entangled in springes laid for them by the fowler; with whom the Fox taking care to be beforehand, very expertly snatches the birds out of the snare, conceals them in different places, leaves them there sometimes for two or three days, and is never at a loss to recover his hidden treasure. He is equally alert in seizing the young hares and rabbits, before they have strength enough to escape him; and when the old ones are wounded and fatigued, he is sure to come upon

them in the moments of distress, and to show them no mercy. In the same manner he finds out the nests of the partridge and the quail, and seizes the mother while sitting.

The Fox is so voracious, that, when deficient of better food, he devours rats, mice, lizards, toads, and serpents. Insects and shell-fish he is likewise sometimes known to eat. In vain does the hedgehog roll itself up into a ball to oppose him: this determined glutton teases it till it is obliged to appear uncovered, and then devours it. The wasp and the wild bee are attacked by him with equal success. Though at first they fly out upon their invader, and actually oblige him to retire, yet this repulse is but for a few minutes, till he has rolled himself upon the ground, and thus crushed such as may have stuck to his skin: he then returns to the charge, and at length, by dint of perseverance, obliges them to abandon their combs, which he greedily devours, both wax and honey.

The young Foxes are born blind, like dogs; like them, too, they are eighteen months or two years in coming to perfection, and live about thirteen or fourteen years. They are nursed with great affection by the mother, who has been known to run with them in her mouth several miles when hunted. The senses of the Fox are as good as those of the wolf; his scent is more acute, and the organ of his voice is more supple and more perfect. The wolf is never heard but by dreadful howls, while the Fox only yelps, barks, and sends forth a mournful sound, resembling the cry of the peacock. His tones, too, are different, according to the different sentiments with which he is affected. He has one sound expressive of desire, another of murmur, another of sorrow, and another of pain: the latter is never heard from him, unless in the instant that he is wounded by a shot, and has lost the use of some member;

for, like the wolf when attacked with cudgels alone, he never murmurs, but will defend himself with obstinacy, and fight in silence to the last gasp. He bites dangerously, and with such determined fury, that, in order to make him relinquish his hold, ponderous wooden and even iron bars are necessary to be forced between his jaws.

The flesh of the Fox is not so bad as the flesh of the wolf. Dogs, and even men, eat it in autumn, especially if the animal has fed on grapes; and, in winter, good furs are made of his skin. He sleeps so sound, that, however closely approached, there is no great danger of awaking him. When he only means to rest himself, he stretches out his hind legs, and remains flat on his belly. In this posture he watches for the birds as they perch on the hedges; who no sooner perceive him than they give each other warning of their approaching danger. The jackdaw and the magpie, in particular, often follow him along to

the distance of some hundred paces, still towering beyond his reach, and with their cries, and notes of hostility, apprize other animals to beware.

Of all wild animals, the Fox is most subjected to the influence of climate; and there are found nearly as many varieties in this species, as in that of any domestic animal.

The generality of Foxes in Europe, are red; of some, however, the hair is of a grayish cast; and, of all, the tip of the tail is white. In the northern countries we find Foxes of all colours.

The preceding cut represents the common European Fox.

ARCTIC FOX.

THE arctic Fox in its full winter dress is entirely of a pure white colour, except at the tip of the tail, where there are a few black hairs intermixed. Before the eyes and on the lower jaw, the hair is short and sleek; on the posterior part of the cheeks and on the forehead it becomes longer, and on the occiput and neck, it equals the ears in length, and is intermixed with soft wool. There is so much wool on the body, that it gives the fur the character of that of the American Hare. In the months of April and May, when the snow begins to disappear, the long white fur falls off, and is replaced by shorter hair, more or less coloured. The head and chin are then brown, having some fine white hairs scattered through the fur. A similar brown color extends along the back to the tail, and down the outside of all the legs; the under parts of the body being of a dingy white.

The perfect similarity of habits, and the series of variations in their fur, may lead us to conclude that the arctic Foxes of the New and Old World are of the same species. They are inhabitants of the most northern lands hitherto discovered, and in North America they are numerous on the

shores of Hudson's Bay, north of Churchill, and exist also in Bhering's Straits.

The brown variety of the Arctic Fox breeds on the sea coast, within the Arctic circle. They form burrows in sandy spots in little villages, twenty or thirty burrows being constructed adjoining each other. Towards the middle of winter they retire to the southward, evidently in search of food, keeping as much as possible on the coast.

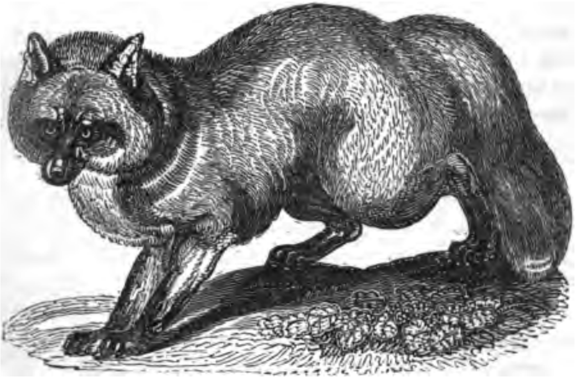
Captain Lyon, who has studied the manners of the Arctic Fox with attention, says," that it bears a great resemblance to the European species, though it is considerably smaller. The general time of rest is during the daylight, in which they appear listless and inactive, but the night no sooner sets in, than all their faculties are awakened: they commence their gambols, and continue in unceasing and rapid motion till morning. Their bark is so modulated, as to give you an idea that the animal is at a distance, although at the very moment he lies at your feet. They feed on eggs, young birds, blubber and carrion of any kind; but their principal food seems to be lemmings of different species. A confinement of a few hours often sufficed to quiet one of them; and some instances have occurred of their being perfectly tame although timid, from the first moment of their captivity. Their fur is of small value in commerce."

Richardson.

SOOTY FOX.

THIS is evidently a mere variety of the Arctic Fox, although Pennant considers it to be a distinct species. It has the form and stature of the Arctic Fox, and may be easily distinguished from the black or silver Fox by its round ears, and its very inferior fur. It is almost entirely of an uniform blackish brown colour. It inhabits the northern parts of America, and in its habits resembles the Arctic Fox.—*Richardson.*

THE AMERICAN FOX.*



THIS Fox is of a bright red colour on the head, back, and sides; on the throat and neck of a dark grey; and pale red on the under parts of the body. It bears a strong resemblance to the common European Fox, but differs from it in the breadth and capacity of its feet for running on the snow; and the quantity of long hair clothing the back part of the cheeks, with the shorter ears and nose, give the head a more compact appearance. It has a much finer brush than the European one, and is altogether a finer animal. It is very plentiful in the wooded district of the fur countries, about 8000 being annually imported into England from thence.

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* This is the common Fox of America, and is frequently met with in all parts of the United States. Cuvier considers it a distinct species, but supposes the common red Fox of Europe to be also an inhabitant of America. Richardson says he did not meet with it, but imagines that it may be found in New Caledonia.

Red Foxes prey much on the smaller animals of the rat family, but they are fond of fish, and reject no kind of animal food that comes in their way. They hunt their food chiefly in the night, though they are frequently seen in the day time. They are taken in steel traps, but much nicety is required in setting them, as the animal is very suspicious.—*Richardson.*

AMERICAN CROSS FOX.

This Fox is considered by the Indians as a mere variety of the Red Fox; the gradations of color between characteristic specimens of the Cross and Red Fox, being so small, that the hunters are very often in doubt with respect to the proper denomination of a skin. The fur is of a grayish black, intermixed with white hairs, crossed with dark stripes. It is very valuable on account of its colour, which is preferred to that of the Red Fox.—*Richardson.*

THE GRAY FOX.*

This animal is said to be the most common species of Fox in the southern parts of the United States, and its skins are sometimes included amongst the Hudson Bay Company's importations from their most southern Canadian posts. It resembles the Cross Fox, though it is smaller in size.
Richardson.

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* The gray Fox is very common throughout this country. It is pursued by sportsmen with more pleasure than the red Fox, because it does not run for miles in one direction, but after various doublings is generally killed near the place where it first started. The general colour of the animal is grisly; the inferior parts of the body are white. The tail is thick and bushy, of a pale yellow colour, and black at the end.—*Richardson.*

BLACK OR SILVER FOX.

This animal is very rare, a greater number than four or five being seldom taken in a season in the fur countries. The fur is six times the value of any other fur produced in North America. It is sometimes found of a shining black, the tip of the tail being white. It is commonly found of a black color, intermixed with hairs tipped with white. It inhabits the same districts with the red Fox. It is not yet clearly proved that it is of the same species as the black Fox of Europe, though it bears a strong resemblance to it.—*Richardson.*

KIT FOX.*

This species of Fox burrows in the open plains extend-

from the branch of a tree; several pieces of meat were also suspended in a similar manner from trees in the vicinity. The following morning the bait over the trap alone remained. Supposing that their exquisite sense of smell warned them of the position of the trap, it was removed and then covered with leaves, and the baits being disposed as before, the leaves to a considerable distance around were burned; and the trap remained perfectly concealed by ashes; still the bait over the trap was avoided. It was not until a log trap was used that an individual of this species was caught. This log trap is made by raising one log above another at one end by means of an upright stick, which rests upon a rounded horizontal trigger on the lower log."—*Godman.*

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* This animal is known also by the name of the Swift Fox, from its extraordinary swiftness. It is said to outstrip the fleetest antelope or deer. It has also the name of the "burrowing Fox."

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shores of Hudson's Bay, north of Churchill, and exist also in Bhering's Straits.

The brown variety of the Arctic Fox breeds on the sea coast, within the Arctic circle. They form burrows in sandy spots in little villages, twenty or thirty burrows being constructed adjoining each other. Towards the middle of winter they retire to the southward, evidently in search of food, keeping as much as possible on the coast.

Captain Lyon, who has studied the manners of the Arctic Fox with attention, says," that it bears a great resemblance to the European species, though it is considerably smaller. The general time of rest is during the daylight, in which they appear listless and inactive, but the night no sooner sets in, than all their faculties are awakened: they commence their gambols, and continue in unceasing and rapid motion till morning. Their bark is so modulated, as to give you an idea that the animal is at a distance, although at the very moment he lies at your feet. They feed on eggs, young birds, blubber and carrion of any kind; but their principal food seems to be lemmings of different species. A confinement of a few hours often sufficed to quiet one of them; and some instances have occurred of their being perfectly tame although timid, from the first moment of their captivity. Their fur is of small value in commerce."

Richardson.

SOOTY FOX.

THIS is evidently a mere variety of the Arctic Fox, although Pennant considers it to be a distinct species. It has the form and stature of the Arctic Fox, and may be easily distinguished from the black or silver Fox by its round ears, and its very inferior fur. It is almost entirely of an uniform blackish brown colour. It inhabits the northern parts of America, and in its habits resembles the Arctic Fox.—*Richardson.*

THE AMERICAN FOX.*

This Fox is of a bright red colour on the head, back, and sides; on the throat and neck of a dark grey; and pale red on the under parts of the body. It bears a strong resemblance to the common European Fox, but differs from it in the breadth and capacity of its feet for running on the snow; and the quantity of long hair clothing the back part of the cheeks, with the shorter ears and nose, give the head a more compact appearance. It has a much finer brush than the European one, and is altogether a finer animal. It is very plentiful in the wooded district of the fur countries, about 8000 being annually imported into England from thence.

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* This is the common Fox of America, and is frequently met with in all parts of the United States. Cuvier considers it a distinct species, but supposes the common red Fox of Europe to be also an inhabitant of America. Richardson says he did not meet with it, but imagines that it may be found in New Caledonia.

Red Foxes prey much on the smaller animals of the rat family, but they are fond of fish, and reject no kind of animal food that comes in their way. They hunt their food chiefly in the night, though they are frequently seen in the day time. They are taken in steel traps, but much nicety is required in setting them, as the animal is very suspicious.—*Richardson.*

AMERICAN CROSS FOX.

This Fox is considered by the Indians as a mere variety of the Red Fox; the gradations of color between characteristic specimens of the Cross and Red Fox, being so small, that the hunters are very often in doubt with respect to the proper denomination of a skin. The fur is of a grayish black, intermixed with white hairs, crossed with dark stripes. It is very valuable on account of its colour, which is preferred to that of the Red Fox.—*Richardson.*

THE GRAY FOX.*

This animal is said to be the most common species of Fox in the southern parts of the United States, and its skins are sometimes included amongst the Hudson Bay Company's importations from their most southern Canadian posts. It resembles the Cross Fox, though it is smaller in size.
Richardson.

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* The gray Fox is very common throughout this country. It is pursued by sportsmen with more pleasure than the red Fox, because it does not run for miles in one direction, but after various doublings is generally killed near the place where it first started. The general colour of the animal is grisly; the inferior parts of the body are white. The tail is thick and bushy, of a pale yellow colour, and black at the end.—*Richardson.*

BLACK OR SILVER FOX.

THIS animal is very rare, a greater number than four or ive being seldom taken in a season in the fur countries. The fur is six times the value of any other fur produced in North America. It is sometimes found of a shining black, he tip of the tail being white. It is commonly found of a black color, intermixed with hairs tipped with white. It nhabits the same districts with the red Fox. It is not yet clearly proved that it is of the same species as the black Fox of Europe, though it bears a strong resemblance o it.—*Richardson.*

KIT FOX.*

THIS species of Fox burrows in the open plains extend-

ing from the Saskatchewan to the Missouri, and also in the plains of the Columbia. These burrows are found at a distance from the woody country, and the animal betakes itself to them on the slightest alarm. It has long been known to the Hudson's Bay fur traders, its skins forming a part of their annual exports, under the name of Kit Foxes. It is the smallest of the American Foxes.—*Richardson.*

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* This animal is known also by the name of the Swift Fox, from ts extraordinary swiftness. It is said to outstrip the fleetest antelope or deer. It has also the name of the "burrowing Fox."

THE BADGER

Is a lazy, distrustful, solitary animal, that retires far from the approach of man, and digs a subterraneous residence, where it spends, at least, three-fourths of its existence, and never ventures forth but in search of food. It burrows in the ground with particular facility, as its body is rather of an oblong form, and its claws, those especially of the fore feet, are very long and compact. The hole which it thus forms often proceeds to a great depth below the surface of the earth, and the passage to it is always oblique and winding.

The Fox, who is less expert at such excavations, often appropriates to his own convenience the labours of the Badger.

Unable to compel him from his retreat by force, it drives him from it by stratagem, often remains a fixed sentinel at the mouth of the passage, disturbs it, and, as an infallible expedient, it is said, emits his ordure. The Badger gone, he immediately assumes possession of it, enlarges it, and very way accommodates it to his own purpose. Though orced to remove to another habitation, this animal does not, owever, remove to another country. At a little distance rom its old burrow, it forms a new one, from which it nevr stirs but at night. The dogs easily overtake it when it s at any distance from its hole, and then, using all its trength, and all its powers of resistance, it throws itself upon its back, and defends itself with desperate resolution. t has one single advantage over its assailants. The kin is so thick, and especially so loose, that the teeth of the dogs can make little impression on it, and the Badger can turn himself round in it, so as to bite them in their enderest parts.

The young Badgers are easily tamed; they will play with young dogs, and, like them, will follow any person whom they know, and from whom they receive their food; but the old ones, in spite of every effort, still remain wild. They are neither mischievous nor voracious, as the fox and the wolf are, yet they are carnivorous; and though raw meat is their favourite food, yet they will eat any thing that comes in their way, as flesh, eggs, cheese, butter, bread, fish, fruit, nuts, roots, &c. They sleep the greatest part of their time, without, however, being subject, like the mountain rat or the dormouse, to a torpor during the winter; and thus it is that, though they feed moderately, they yet are always fat.

Their hole they keep exceedingly clean, nor are they ever known to void their ordure in it. The male is rarely to be found with the female. In summer she brings forth, and her usual number at a birth is three or four. These she feeds at first with her milk, and afterwards with such petty prey as she can surprise. She seizes young rabbits in the warren, robs birds of their young, while yet in the nest, finds out where the wild bees have laid up their honey, where field-mice, lizards, serpents, and grasshoppers are to be met with; and carries all to her expecting brood, which she frequently brings forward to the mouth of her hole.

These animals are naturally of a chilly temperament. Such as are reared in a house seem to be never more happy than when near a fire. They are likewise very subject to the mange; and, unless carefully washed, the dogs that penetrate into their burrows are seized with the same distemper.

The hair of the Badger is always filthy; between the anus and the tail there is an opening, which, though it has no communication with any interior part, and is hardly an inch deep, continually emits an oily liquid. This the animal is fond of sucking. Its flesh, when the animal is well fed, makes excellent hams and bacon; and of its skin are made coarse furs, collars for dogs, and trappings for horses. The hair is used for painters' brushes.

In America, hunting this animal forms a source of amusement and emolument to the Indians of Bocca Montana, Albarregas, and most tribes that inhabit the higher regions of the Cordilleras, from Coro to Cumana. As there are no stated periods for taking it, although in the months of August, September, and October, it is certainly fattest, they continue to search for it the whole year round, unless during the breeding season, when the flesh is lank and lean, and the lard, or butter, *(manteca)*, rancid. In making their hunting dispositions, they form parties of seven or eight, or more. When the tribe is numerous, they will sometimes take five, six, or seven miles in a sweep over the country; and such is their dexterity and address in taking these animals, that they will nearly clear it for five or six years of Badgers, notwithstanding all the obstruction of brushwood, cover, &c. &c. In these excursions they are ccompanied by a number of women and boys, whose business it is to build temporary huts, cook, collect fruits, nd, lastly, to cure what Badger hams and gammons the nen catch: this is no sinecure, and although they rest duing the night, the day ushers them in more labour than omes to the hunters' share. When they arrive at the Badgers' haunts,—generally in high situations, contiguous o rocks, for the purpose of burrowing when hard pressed,—hey soon discover his traces by the manner in which he scrapes for pistachios and other nuts. They then search he rock until they find the burrow, and also under the proecting roots of large trees, the hollows of which afford hem shelter. When the burrows are in trees, they eldom give themselves the trouble of erecting pitfalls for them, as their curs kill and drag them out, or else they dig them out. When the burrows are in the rocks, they et to work to erect pitfalls or traps, in the building of which they display a regularity and system that would do credit to a European mason. As the falls are four feet by four in height and breadth, the flags with which they are built are so closely set, as to prevent the creature introducing his paw-nails between them; for his strength is such that he would raise a stone of two or three hundred weight. As the Badger's family generally consists of seven or eight, he hunters set as many pitfalls in their way as will intercept them, one by one, in making their passage to their burows; and frequently one in the mouth of the burrow, proided it is large enough, covering them with turf, earth, and leaves over little twigs. As soon as they have made a ufficient number, with incredible labour and perseverance, using no other implements than their hatchets and stonehammers, the covering-flag is placed over; at the back of this they place a quantity of rubbish, so as to give weight to its fall, and plant bushes so artfully as to deceive a stranger, forming a lane, through which the creature must necessarily pass to his burrow. Then one or two ascend the trees or highest rock, to give notice of the Badger's approach; while another is buried in sight of the traps in such a manner as to be covered with leaves, and in such a posture as to observe the creatures coming toward the traps, and hurry them into them by missiles, but never attempts to show himself until the Badger passes him. In this manner the remainder of the party advance into the brushwood, and then let loose their dogs, who, on scenting the Badgers, sets up a whining cry, accompanied by the rattles of the Indians, making the Badger start and betake himself to his burrow. Sometimes seven or eight will start together, the most of which are always caught; but should one escape, they again hunt the ground over. If their party is not numerous enough, the women join after the first chase, as the danger of coming in contact with tigers is over, the first noise having started these as well as most noxious creatures. Indeed, the Badger is seldom found near the jungle, as he is not fond of such neighbours. Should one escape the traps, which is very seldom the case they leave the traps set day and night, and a man to watch him, until hunger forces him to quit his subterraneous abode. Sometimes the Indian curs will enter, and kill the creature, if his burrow is large enough to admit them; yet he often makes them retreat, provided they cannot surround him, although those curs are certainly superior to our European terriers in bite, and tenacity of their hold. Whenever a Badger earths, the Indians cast lots, to know which shall watch until the Badger breaks, leaving him two days' provisions in the mean time, supposing this to be the usual time until the animal bolts. But it is sometimes a toss up which will hold out longest, especially if it be an old Badger: but even here the Indian has decidedly the advantage, as he is known to endure four days' hunger, without any bad results. If it happens in harvest, he is pretty well off; for his cunning makes him an overmatch for the animal, and he always carries the image of a man of rude workmanship, which he sets before he earth, supported by twigs in a moving position: this prevents the Badger stirring while the Indian goes in quest of food, a work of little time with him, as he is satisfied with the first thing he finds. He soon returns to await the coming out of his subterraneous visiter, as the disgrace of returning without the Badger is shocking to a hunter, and debars his ever being a *guapo*, or warrior, until he can, by some very extraordinary feat, wipe this stain off his name. They also use the noose or snare to catch these creatures, which is placed across the pathways, like rabbit-wires, with this exception, that the Indian snare is attached to a spring pole, that suspends and strangles the creature. The South American Badger is larger than those in Europe, and much browner: he is also much easier killed.

Perhaps its habits are the most social of any quadruped in the universe; it is not known to quarrel with any other quadruped; even the fox, polecat, stinkard, the oppossum, the land crab and snake, make it resign its abode, although it is much stronger than any of them. It also lives in the greatest harmony with its own species, subsisting principally on nuts, roots, and vegetables; and is cleanly in its habits, being observed to perform its ablution while the dew is on the ground. The Indians count two species of it, *viz.* the Marona, or pig-badger; and the Pero, or dog-badger. I am informed the former roots for its amusement like a pig; they bring forth two, three, and four at a litter, and preserve them carefully. Badger hams are certainly delicious, and the sale of them was prohibited but to the viceroy, who generally shipped a quantity of them annually to Madrid for the use of their august majesties: no they are purchased for one-fourth the original value, a the viceroy sometimes paid eight or ten dollars for a pai of gammons. The way of curing them, perhaps, contributed to their flavour, which was simply to rub them wit coarse sugar and Chili pepper, each day pressing them very hard until quite dry. This source of emolumen would have been considerable to these hunting tribes, wer they not cheated and made tributary to the viceroy, a they had to give him a dozen first, and afterwards tak trinkets out of the stores, at whatever price he chose t demand. The butter, or manteca de marano, as they cal the lard, was also in great demand among the grandees who fried most of their food in it.

A party of eight would destroy two or three hundre Badgers and a quantity of deer, on their return home, besides guanas. These hunting parties are so delightfu even to the women, that the hopes of being allowed to accompany the men will be a stimulus to conduct themselves properly the year round. On those excursions the live well, and seem more happy than during the rain season: in their way home they travel day and night rapidly, in spite of all obstructions, carrying long poles betwe them, on which the animals are slung: the skins and lar the boys carry. The women are certainly the heavie loaded, and must keep pace with those gentry: the dog too are better fed during this period, and seem to retur with regret. A cloud of vultures generally hover ove them, and are seen by their clans a day or two before the arrive, who make every preparation to receive them their return is greeted like that of victors. The rain nights are passed in recounting their exploits one t another.

THE NORTH AMERICAN BADGER.

THE American Badger, as compared with the European, is generally less in size, and of a lighter make; the head, though equally long, is not so sharp towards the nose, and the markings on the fur are remarkably different. A narrow white line runs from between the eyes towards the back, the rest of the upper part of the head is brown, the throat and whole under jaw are white, the cheeks partly so; a semicircular brown spot is placed between the light part of the cheeks, and the ears.

The American Badger frequents the sandy plains or prairies, which skirt the Rocky Mountains, as far north as latitude 58°. It abounds on the plains watered by the Missouri, but its exact southern range has not, as far as I know, been defined by any traveller. The sand prairies, in the neighborhood of Carlton-house, on the banks of the Saskatchewan, and also on the Red River, that flows into Lake Winnipeg, are perforated by innumerable Badger-holes, which are a great annoyance to horseman, particularly when the ground is covered with snow.

Whilst the ground is covered with snow, the Badger rarely comes from its hole; and I suppose that in that climate it passes the winter from the beginning of November to April, in a torpid state. Indeed, as it obtains the small animals on which it feeds by surprising them in their burrows, it has little chance of digging them out at a time when the ground is frozen into a solid rock. Like the bears, the Badgers do not lose much flesh during their long hibernation; for on coming abroad in the spring, they are observed to be very fat. As they pair, however, at hat season, they soon become lean.

This Badger is a slow and timid animal, taking to the irst earth it comes to, when pursued; and as it makes its

way through the sandy soil with the rapidity of a mole, it soon places itself out of the reach of danger. The strength of its fore feet and claws is so great, that one which had insinuated only its head and shoulders into a hole, resisted the utmost efforts of two stout young men, who endeavored to drag it out by the hind legs and tail, until one of them fired the contents of his fowling piece into his body. Early in the spring, however, when they first begin to stir abroad, they may be easily caught by pouring water into their holes; for the ground being frozen at that period, the water does not escape through the sand, but soon fills the hole, and its tenant is obliged to come out.

The American Badger appears to be a more carnivorous animal than the European one. A female which I killed had a small marmot, nearly entire, together with some field mice, in its stomach. It had also been eating some vegetable matters.—*Richardson.*

THE WOLVERENE.

THIS animal has a broad compact head, which is suddenly rounded off on every side, to form the nose. In the shape of its jaws it resembles a dog. Its ears are low, rounded, and much hid by the surrounding fur. The back is arched, the tail low and bushy; the legs thic and short; and the whole aspect of the animal indicates strength without much activity. The fur bears a grea similarity to that of the black bear, but is not so long, n of so much value.

The Wolverene is a carnivorous animal, which feeds chiefly upon the carcasses of beasts that have been killed by accident. It has great strength, and annoys the natives by destroying their hoards of provision, and demolishing their marten traps. It is so suspicious, that it wil rarely enter a trap itself, but beginning behind, pulls it pieces, scatters the logs of which it is built, and then carries off the bait. It feeds also on meadow mice, marmots, and other *redentia*, and occasionally on disabled quadrupeds of a larger size. I have seen one chasing an American hare, which was at the same time harassed by a snowy owl. It resembles the bear in its gait, and is not fleet; but it is very industrious, and no doubt feeds well, as it is generally fat. It is much abroad in the winter, and the track of its journey in a single night may be traced for many miles.—*Richardson.*

THE OTTER.

Of the Otter tribe there are eight species known, of which, however, it will be necessary for us to describe only two. Otters have six sharpish cutting teeth in each jaw, the lower of which do not range in a line with the rest, two of them being placed somewhat within the others. The canine teeth are also longer than the others. Webbed feet are common to all the varieties of this tribe, which are likewise characterized by very long bodies and short legs.

The Common Otter is of a deep brown colour, and is usually about two feet in length from the tip of the nose to the insertion of the tail; the head and nose are broad and

way through the sandy soil with the rapidity of a mole, it soon places itself out of the reach of danger. The strength of its fore feet and claws is so great, that one which had insinuated only its head and shoulders into a hole, resisted the utmost efforts of two stout young men, who endeavored to drag it out by the hind legs and tail, until one of them fired the contents of his fowling piece into his body. Early in the spring, however, when they first begin to stir abroad, they may be easily caught by pouring water into their holes; for the ground being frozen at that period, the water does not escape through the sand, but soon fills the hole, and its tenant is obliged to come out.

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The **Common Otter** is of a deep brown colour, and is usually about two feet in length from the tip of the nose to the insertion of the tail; the head and nose are broad and flat; the mouth bears some similitude to that of a fish; the neck is short, and equal in thickness to the head; the body long: the tail broad at the insertion, but tapering off to a point, and about sixteen inches long; the eyes are very small, and placed nearer to the nose than is customary in quadrupeds. The legs are very short, but remarkably strong, broad, and muscular, and so placed as to be capable of being brought into a line with the body, and performing the office of fins; and each foot is furnished with five toes, connected by strong broad webs, like those of waterfowl.

Accurately considered, the Otter cannot be pronounced an amphibious animal. We even find them drowned when they happen to have been entangled in a net; and this evidently for want of having had time to destroy it, and thereby effect their escape. For want of fish, frogs, water-rats, or other nourishment, it will eat the young branches, and the bark of aquatic trees; and in spring it will eat new grass.

These voracious animals are generally found at the sides of lakes and rivers, but particularly the former, in which they destroy so much more than they devour, that they will sometimes spoil a pond in the space of a few nights. They do equal mischief by tearing in pieces the fishermen's nets, which they infallibly do, whenever they happen to get entangled in them. In forming its retreat the Otter displays great sagacity. It makes the entrance under water, burrows upwards, provides several cells to retire to in case of floods, and opens on the surface a small orifice for the admission of air, which orifice it contrives so as to be concealed by a thick bush. The female goes with young about nine weeks, and generally produces four or five at a time. These are always found at the edge of the water; and, if under the protection of the dam, she teaches them, on the approach of an enemy, to plunge, like herself, into the deep, and escape among the weeds or rushes that fringe the stream. It is, therefore, only in the absence of the dam, that the young can be taken; and in some places there are dogs purposely trained for discovering their retreats. One of the favourite pastimes of the Otter is, to get on a high ridge of snow, bend their fore feet backward, and slide down the side of it, sometimes to the distance of more than twenty yards.

If taken while young, the Otter may be tamed and taught to fish for its master, and will become almost as affectionate and docile as the dog.

For the destruction which he makes among the finny tribe, and also the disturbance which he gives them in their haunts, the Otter is an object of abhorrence to the angler. Old Izaak Walton calls them "villanous vermin," and many other hard names, and declares that, in his judgment, "all men that keep Otter-dogs ought to have pensions from the king, to encourage them to destroy the breed of these base Otters."

Unless it can be shot, it is difficult to capture the Otter, when the water is not frozen, as it takes to the water, dives, and only occasionally "vents," as the hunter terms it; that is, raises its nose to the surface to breathe. "The old hunters (says a recent writer), who set more value upon the difficulty of the capture, than on the prey itself, attack the Otter *in posse comitatus*, beat the banks with dogs, hedge in a space with nets, and assail the Otter with clubs and spears, when he comes up to breathe." This was precisely the manner in which an Otter hunt was conducted in the days of honest Izaak, and he seems to have considered it as the finest of all sports, except angling.

In South America, hunting the Otter forms a recreation for the grandees or better sort of gentry for two or three months in the year, like European grousing or partridge

shooting parties. The sport is thus described by a recent traveller:—In the month of May, the parties assemble by previous arrangement, composed principally of the chief inhabitants of these districts and their relatives or clans, and visiters, male slaves, muleteers, &c. Having ascended the waterfalls, they encamp near those clear and transparent rivers in which Otters abound in great numbers. After the business of physicking the bloodhounds and a species of blueish cur without any hair, they make their hunting dispositions, and appoint their land and water captains to head each party; the duty of the latter is to stand in the prow of the canoe, and cheer the dogs to the prey. A huntsman, in fact, is mostly an Indian, as those dogs will not hunt to any other tongue; what this is owing to, whether custom or sagacity, I know not, but it is certainly the case; however, the young Spaniards and Creoles have latterly remedied this defect, and are now as well qualified to hunt a bloodhound in the Indian tongue as an Indian himself. Both parties having armed themselves with Otter spears, barbed like harpoons, and with long handles made of rough light wood about ten feet or more, they cheer on the bloodhounds, who no sooner wind the prey than they join chorus with their huntsman, until they arrive near the Calle Pero, or Otter city, when the land party divide into three; one watches; another ascends the ford; while the others poke the banks, in order to eject the creature. As soon as he is started, the hounds are again in full cry, and the curs are loosed to dive after him, and will relieve each other in this task: as soon as one is up, down goes the other, while the hounds keep up the cry in the water at a slow pace, until they eventually force the creature to the head of the stream into shallow water, where these curs either snap him up, or he is speared by the hunters; after this the hounds are allowed the gratification

of mouthing him until satisfied, when they again return to depopulate this little commonwealth of Otters.

After all the old Otters have fled, the young ones betake themselves to the uppermost recesses of their burrows, and defend themselves with great obstinacy when they are dug out of their habitation; a slight blow on their forehead will soon despatch them, as that seems their most vulnerable part. In their abode the heads, tails, fins, and fragments of several species of fish are to be seen; for the Otter is, like most aquatic monsters, a glutton. As he seldom eats more than a mouthful of each fish, he must cause frightful destruction among the finny race, and his depredation causes his haunts to be found out at low water, when the hounds would otherwise pass him.

Abbé Ricardo, who wrote a little treatise on the history of this animal, about a century ago (which is still in good preservation in the cathedral of Caracas) relates, that while the parent Otters are in existence, they do not suffer the young gentry to attempt propagating the species, but that the young are two or three years under their parents' guardianship. One thing is very certain,—in the same community are to be met three or four different generations of those creatures under the guidance of their patriarch. The alligator is the only aquatic enemy of this creature, with the exception of the shark, with whom he has very little intercourse. It seems Father Ricardo caused a cage pond to be erected in his garden, in order to study their natural history. His little work teems with amusing anecdotes of the aboriginal hunters, of whose club he was a member; those gentry, he said, during such excursions, lived well. Certainly, the echoing cry of hounds and hunters is the most delightful I ever heard. It vibrates through every glen at the distance of five or six miles.

The colour of the South American Otter is different

from that of the European: the latter is much darker; and the male is still darker than the female, who generally gets brown while suckling her puppies; Abbé Ricardo says that they change coats. The skin is now more valuable than formerly, as General Parr's cavalry use them for pistol covers, and foraging regimental caps are made of them. They also use their skins for segar cases, and the Indians eat their flesh. In destroying fish, the Otter rejects the head, and will not use it, although pressed by hunger. In Buenos Ayres there is one quite domesticated, which will invariably bring home what it gets in the river: but tame habits make it lazy and indolent; it is vicious during the breeding season, and is obliged to be chained.

CANADA OTTER.*

Mr. Frederick Cuvier not only separates the Otter of Canada from that of South America, but also describes a distinct species inhabiting an intermediate district.

The Canada Otter resembles the European species in its habits and food, but it may be distinguished from it, by the fur of its belly being of the same shining brown as its back. It is a much larger animal, and has, in proportion, a shorter tail than the European one. In the winter season it frequents rapids and falls, to have the advantage of open water, and when its usual haunts are frozen over, it will travel to a great distance, through the snow, in search of a rapid which has resisted the severity of the weather. If it is seen, it throws itself on its belly, and slides through the snow for several yards, leaving a deep furrow behind it. This movement is made with great rapidity. When closely pressed, it will turn and defend itself with great obstinacy. It inhabits the Mackenzie and other rivers nearly to the Arctic Sea.

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* The Otter inhabits South as well as North America.—In the southern, middle and eastern states they are scarce; but in the western states, they are found in considerable numbers.—*Godman.*

Richardson.

THE SEA OTTER.

This harmless, playful, and interesting animal is generally about four feet long, thirteen inches of which are occupied by the tail. The fur is of great value, it being soft and of a deep glossy black. It has long been exported in great quantities by the Russians, who received eighty or a hundred rubles from the Chinese for each skin until the market was overstocked. The Sea Otter is to be found only within a very few degrees of latitude in the North Pacific; its range being mostly confined to the coast of Kamtschatka, the adjoining islands, and the opposite American shore. Sea Otters are perfectly inoffensive, and so sportive that much of their time seems to be passed in playing diverting tricks. They live in pairs, and are very constant to each other. Such is their fondness for their young, that they will never abandon them; on being robbed of them, they will starve themselves to death, and will endeavour to breathe their last on the spot where their offspring were destroyed.

THE MINK, OR VISON WEASEL.

This animal is found throughout a great extent of country from Carolina to Hudson's Bay, and in its habits and appearance resembles the otter. The favourite haunts of this species are the banks of streams, where it inhabits holes near the water. It is an excellent swimmer and diver, and feeds on frogs and fish. It also commits great depredations in the poultry-yard. When provoked, it ejects a fetid liquor, which is exceedingly unpleasant.

Godman.

THE MARTIN.

The generality of naturalists have considered the Martin and the Pine Martin as animals of one and the same species. They are, however, different both in disposition and temperament. The Pine Martin shuns open countries, confines itself to the bosom of the forest, fixes its residence upon some tree, and is never found in great numbers but in cold climates; while the Martin not only approaches human habitations, but even forms a residence for itself in old buildings, in haylofts, in holes of walls, and the species is generally diffused in great numbers over all the temperate climates.

The countenance of the Martin is very sharp; its head is small and elegantly formed; its eye is lively; its limbs are supple; its body is astonishingly flexible; and all its movements are quick. The back, sides, and tail of the Martin are covered with a fine downy fur, with longer hair intermixed; the roots of an ash colour, the middle of a bright chesnut, and the points black. The head is brown, with a slight cast of red; the legs and feet are of a chocolate colour, and the throat and breast are white. It rather leaps and bounds than walks; and with great facility climbs walls, enters pigeon-houses and hen-houses, devours the eggs, the pigeons, and the hens, as on other occasions it does mice, rats, moles, and birds in their nests.

Of small feeble animals it disclocates the neck, and divides the spinal marrow by a single crush of its jaws; but it seizes large strong animals on the side of the neck, behind the ear, and divides the vessels with anatomical precision.

This animal, it is said, brings forth as often as the cat. The growth of the young ones is very quick; and hence it may be inferred, that it is an animal whose life does not exceed eight or ten years. Its smell, which is agreeable, is like that of counterfeit musk. Both the Martin and the Pine Martin, as well as a number of other animals, have interior vesicles which contain a strong scented substance like that which the civet furnishes.

THE PINE MARTIN, OR PINE WEASEL,

Originally a native of the north, is in a manner peculiar to that climate, where they are so numerous, that the quantity of furs produced from this animal alone, and carried into foreign countries, is actually astonishing. In temperate climates, on the contrary, it is rarely, and in warm climates never, to be found. Some there are in Burgundy, and some in the forest of Fontainbleau; but in general they are as scarce in France as the Martin is common. It is not uncommon in the wild parts of Scotland, among the wooded ravines of the mountains.

Alike averse to open countries, and to countries which are inhabited, it remains in the bosom of some forest, ranges below through the labyrinths of the thicket, or towers aloft upon the branches of trees. It subsists by the chase, and destroys a prodigious quantity of birds, whose nests it searches for, and invades, in order to devour the eggs. Of the squirrel, the dormouse, &c. it also makes a prey; and it is known to eat honey as well as the Martin. In the description of the wild cat we have given an account of the combats of that animal with the Pine Martin.

To this may be added, with respect to the latter, that it is said to be sometimes victorious even over the golden eagle, when that bird pounces on it as its prey. It seizes the aggressor by the throat, and the loss of blood soon brings down the eagle lifeless from its "pride of place."

Its neck is yellow, whereas that of the Martin is white: and its hair, at the same time, is much finer, thicker, and less subject to shed.

When the female is near her time, her custom is to climb to the nest of some squirrel, to drive her from it, to enlarge it for her own purpose, and to bring forth her young in it. In the same manner, she occupies the old nests of the owl and the buzzard, as also the hollow places of trees, from which she presently dislodges the woodpecker, and other birds.

THE PEKAN, OR FISHER.

This animal has been described by authors under many appellations. A considerable number of its skins are annually imported into England by the Hudson's Bay company. It is a larger and stronger animal than any variety of the pine martin, but it has similar manners; climbing trees with facility, and preying on mice. It inhabits a wide extent of country from Pennsylvania to Slave Lake. It is also found on the shores of the Pacific.

Richardson.

THE SABLE.

This animal resembles the martin, and is found in great numbers in Siberia and Kamtschatka. Its fur is very valuable, and the Russian government derives considerable revenue from its sale. Pennant and Godman both say it is found in the northern parts of our continent; but Richardson does not mention it in his Fauna Boreali Americana.

THE POLECAT, OR FITCHET,

Is somewhat smaller than the martin; its tail is shorter; its snout sharper; and its hair thicker. It differs likewise in its voice; the cry of the martin being rather sharp and loud, that of the Polecat deeper and more hollow. It is about seventeen inches in length; of a deep chocolate colour, nearly approaching to black; has short ears, tipped with white, and the tail is covered with longish hair. In summer he generally lives in woods, thick brakes, or rabbit warrens. His burrow is about two yards deep, and commonly ends under the root of a tree. In winter, he haunts barns, haylofts, and other outhouses, whence he sallies forth on the poultry.

The Polecat does not at all resemble the martin in smell, which, in the former, far from being agreeable, is to the last degree fetid. When heated or enraged especially, it sends forth and diffuses a stench that is absolutely intolerable. The dogs will not eat its flesh; and even its skin, though good in itself, sells at a very low price, as it can never be entirely divested of its natural odour.

These animals are very destructive to young game of all kinds, and commit dreadful devastations among pigeons when they get into a dove-house. Without making so much noise as the weasel, they do a great deal more mischief; dispatching each victim with a single wound in the head, and satiating themselves with copious draughts of blood, after which they carry off the prey: or if the aperture by which they entered will not admit of this, they first eat the brains, and then carry away the head, leaving the body behind. They are also extremely fond of honey, and are frequently known, in winter, to attack the hives, and drive away the bees. Rabbits, however, seem to be their favourite prey, and a single Polecat is often sufficient to destroy a whole warren. They will also catch and eat fish, though, probably, this is done by them only when other food is not attainable. This animal is not a native of America.

THE SKUNK.

This animal inhabits the whole of North America, and is also found throughout a part of the southern portion of that continent. A considerable number of animals of this genus are natives of America, resembling each other strongly in form and size, but differing in the number and variety of their stripes and markings, have been described by authors as so many distinct species. Baron Cuvier thinks that the present state of our knowledge of these animals does not warrant us in considering them otherwise than as varieties of a single species, and of these varieties he enumerates fifteen.

This animal is of a brown colour, marked sometimes with two white stripes. The faculty this animal possesses, of annoying its enemies by the discharge of a noisome fluid, causes it to be rather shunned than hunted, which the value of its skin would otherwise be sure to occasion. The smallest drop of this fluid is sufficient to render a garment detestable for a great length of time. Washing, smoking, baking or burying articles of dress, seems to be equally inefficient for its removal.

The Skunk is generally found in the forests, having its den either in the stump of an old tree, or in an excavation in the ground. It feeds on the young of birds, and upon small quadrupeds, eggs, wild fruits, &c. It also does much mischief in the poultry-yard.

THE FERRET.

It has been doubted by some authors, whether or not the Ferret and the polecat were animals of two different species. Perhaps, the resemblance there sometimes is in the colour of their hair first gave rise to this uncertainty. The polecat, nevertheless, a native of temperate climates, is an animal wild like the martin; whereas the Ferret, originally an inhabitant of Africa, can only exist in Europe as a domestic animal. The Ferret also, and not the polecat, is made choice of to drive the rabbits from their burrows, chiefly because it is more easily tamed. The Ferret has a longer and thinner body, a narrower head and a sharper snout, than the polecat. It has not the same sagacity in providing for its subsistence; it cannot exist, at least in England or France, without the care of man, nor have such of the species as have been lost in the burrows of rabbits, been ever known to multiply in the country; but have, on the contrary, perished, to all appearance, by the severity of the winter.

This animal is by nature a mortal enemy to the rabbit. If even a dead one is presented to a young Ferret which had never seen one before, it springs at it, and tears it with fury; if it be a living one, it seizes it by the neck and nose, and instantly begins to suck its blood. When the Ferret is let loose into the burrows of the rabbits, it is necessary to muzzle him, that he may not kill them at the bottom, but only oblige them to run out, and thereby fall into the net laid for them at the entry. If he is allowed to go unmuzzled, there is a risk of losing him, because, after having sucked the blood of the rabbit, he will fall asleep; and the smoke which is raised at the mouth of the burrow does not always prove a sufficient expedient for bringing him back, as there are often more issues than one, and as one burrow generally communicates with others, in which the Ferret is apt to be the more bewildered, the more he is surrounded with the smoke.

shooting parties. The sport is thus described by a recent traveller:—In the month of May, the parties assemble by previous arrangement, composed principally of the chief inhabitants of these districts and their relatives or clans, and visiters, male slaves, muleteers, &c. Having ascended the waterfalls, they encamp near those clear and transparent rivers in which Otters abound in great numbers. After the business of physicking the bloodhounds and a species of blueish cur without any hair, they make their hunting dispositions, and appoint their land and water captains to head each party; the duty of the latter is to stand in the prow of the canoe, and cheer the dogs to the prey. A huntsman, in fact, is mostly an Indian, as those dogs will not hunt to any other tongue; what this is owing to, whether custom or sagacity, I know not, but it is certainly the case; however, the young Spaniards and Creoles have latterly remedied this defect, and are now as well qualified to hunt a bloodhound in the Indian tongue as an Indian himself. Both parties having armed themselves with Otter spears, barbed like harpoons, and with long handles made of rough light wood about ten feet or more, they cheer on the bloodhounds, who no sooner wind the prey than they join chorus with their huntsman, until they arrive near the Calle Pero, or Otter city, when the land party divide into three; one watches; another ascends the ford; while the others poke the banks, in order to eject the creature. As soon as he is started, the hounds are again in full cry, and the curs are loosed to dive after him, and will relieve each other in this task: as soon as one is up, down goes the other, while the hounds keep up the cry in the water at a slow pace, until they eventually force the creature to the head of the stream into shallow water, where these curs either snap him up, or he is speared by the hunters; after this the hounds are allowed the gratification

of mouthing him until satisfied, when they again return to depopulate this little commonwealth of Otters.

After all the old Otters have fled, the young ones betake themselves to the uppermost recesses of their burrows, and defend themselves with great obstinacy when they are dug out of their habitation; a slight blow on their forehead will soon despatch them, as that seems their most vulnerable part. In their abode the heads, tails, fins, and fragments of several species of fish are to be seen; for the Otter is, like most aquatic monsters, a glutton. As he seldom eats more than a mouthful of each fish, he must cause frightful destruction among the finny race, and his depredation causes his haunts to be found out at low water, when the hounds would otherwise pass him.

Abbé Ricardo, who wrote a little treatise on the history of this animal, about a century ago (which is still in good preservation in the cathedral of Caracas) relates, that while the parent Otters are in existence, they do not suffer the young gentry to attempt propagating the species, but that the young are two or three years under their parents' guardianship. One thing is very certain,—in the same community are to be met three or four different generations of those creatures under the guidance of their patriarch. The alligator is the only aquatic enemy of this creature, with the exception of the shark, with whom he has very little intercourse. It seems Father Ricardo caused a cage pond to be erected in his garden, in order to study their natural history. His little work teems with amusing anecdotes of the aboriginal hunters, of whose club he was a member; those gentry, he said, during such excursions, lived well. Certainly, the echoing cry of hounds and hunters is the most delightful I ever heard. It vibrates through every glen at the distance of five or six miles.

The colour of the South American Otter is different

Though it is a less common animal than the Weasel, yet there are numbers to be found in the old forests, and sometimes during the winter in the neighbourhood of woody grounds. It is always easy to distinguish it from the common weasel, because the tip of its tail is uniformly of a deep black, while the edges of its ears, and the extremities of its feet, are white.

CHAP. XII.

Of certain smaller Animals of the carnivorous Class...The Squirrel...The Rat...The Brown Rat...The Water Rat...The Mouse....The Long-tailed Field Mouse...The Short-tailed Field Mouse...The Shrew Mouse...The Water Shrew Mouse...The Bat...The Fat Squirrel... The Garden Squirrel, or Great Dormouse...The common Dormouse...The Guinea Pig...The Mole...The Hedgehog...The Marmot.

THE SQUIRREL.

THE COMMON SQUIRREL of Europe is a beautiful little animal, which is only half wild, and which, by its gentleness, its docility, and even the innocence of its manners, might deserve to be exempted from the present class. It is neither properly a carnivorous nor an injurious animal, though it sometimes seizes on birds; its general food consisting of fruit, almonds, hazle-nuts, beech-mast, and acorns: it is neat, cleanly, alert, lively, and industrious;

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middle and eastern states it is most generally known as the *Weasel.* Farther north it is called *Stoat* in its summer, and Ermine in its winter pelage of pure white. Richardson says that both the Ermine or Stoat, and the common Weasel of Europe are indubitably found in America; the former extending to the most remote arctic districts, and the latter as far north as the Saskatchewan river.

its eyes are large, black, and full of fire, its countenance is sharp, its body is nervous, and its limbs are supple. It is of a bright brown colour, inclining to red; the breast and belly are white; the ears are ornamented with long tufts of hair. The fore feet are strong and sharp, and the fore legs are curiously furnished with long stiff hairs, projecting on each side like whiskers.

The beauty of its form is yet heightened by a spreading tail, in shape like a plume of feathers, which it raises above its head, and forms into a kind of shade for itself.

The Squirrel may be said to be less a quadruped than almost any other four-footed animal. It generally holds itself almost upright, using its fore feet as hands for a conveyance to its mouth. Instead of hiding itself in the earth, it is continually in the air: it somewhat resembles the birds by its lightness and activity; like them, it rests upon the branches of trees; leaping from one to the other, and in the highest of them builds its nest. It avoids the water still more than the earth; and it is even asserted of this animal, that, when it is obliged to cross a river or stream, it uses the bark of a tree, or some such light woody substance, as a boat, while its tail supplies the place of sails, and of a rudder. It gathers together a quantity of nuts during the summer, which it deposits in

the hollow part of some old tree, and to these has recourse for provision in winter; and such is the agility of its body, that it will, in an instant, climb a beech tree, let its bark be ever so smooth.

There are many species which approach to that of the Squirrel, though there are few varieties in the species itself. Some there are of an ash colour, and all the others are red. The small gray Squirrel is of a different species, and remains always gray: and, without mentioning the flying Squirrels, which are very different from the others; the white Squirrel of Cambaye, which is very small, and has a tail like that of the European Squirrel; that of Madagascar, called *Tsitsihi*, which is gray, and which, as Flacourt says, is neither handsome nor fit to be tamed; the white Squirrel of Siam; the gray, and spotted Squirrel of Bengal; the streaked Squirrel of America; the black Squirrel; the gray Virginian Squirrel; the white-striped Squirrel of New Spain; the white Siberian Squirrel; the variegated Squirrel; the little Squirrel of Brazil; that of Barbary; the *palmist*, &c. form so many species entirely distinct and separate from that of which we have been treating.

THE LONG-TAILED SQUIRREL

Is about three times the size of the common Squirrel. It is of a blackish colour, and is a native of Ceylon and Malabar.

THE PALM SQUIRREL.

The Palm Squirrel is a native of the southeastern part of Asia and the neighbouring islands, and is about the size of a rat. It lives upon palm trees. It is a familiar creature, and will enter houses, and pick up crumbs that drop from the table. Its back is variegated with stripes.

GRAY SQUIRREL OF EUROPE.

This animal is nearly the size of the American gray Squirrel. It migrates to immense distances. It crosses rivers on a piece of pine bark, and uses its tail as a sail. It makes its nest in hollow trees; and lays up stores of provisions for winter use, in holes made in the ground.

SQUIRREL OF BARBARY AND SWITZERLAND.

THE Squirrel of Barbary resembles the palm Squirrel, but there is still reason to believe them separate animals. The Swiss Squirrel lives in the earth, and forms a retreat that water cannot penetrate. It bites unmercifully, and is more like a rat than a Squirrel in his nature.

SQUIRRELS OF AMERICA.

WE have selected from Godman and Richardson, the following species of American Squirrels, with a few of the localities and peculiarities of each.

The FOX SQUIRREL is found throughout the southern States, where it frequents the pine forests in considerable numbers, and derives its principal subsistence from the seed of the pine. The nest is placed in the top of a high pine

tree, and is made of twigs and small sticks. The colour of the fox Squirrel varies from white to pale gray and black, and is sometimes mottled, with various shades of red.

The CAT SQUIRREL is one of the largest species, and is found in great abundance in the oak and chesnut forests of the country. It resembles the fox Squirrel in every thing but size, being much larger than that animal. It is a very heavy animal, and is slow in its movements, seldom leaping from tree to tree, unless it is alarmed or closely pursued. It is found of almost every variety of colour.

The BLACK SQUIRREL is very common, but is often confounded with the black varieties of the Squirrels before described. In the winter, this animal is of a pure black; in the summer, it is of a greyish black intermingled with a dark reddish brown. It is found in the United States, and inhabits the northern shores of Lakes Huron and Superior.

The COMMON GRAY SQUIRREL is remarkable for its beauty and activity, and is common throughout the United States. It is generally found in hickory and chesnut woods, where it feeds on nuts, and lays up a hoard for the winter. They construct their nests with care on the tops of tall trees, and seldom leave them during the cold weather. They do a great deal of mischief in the corn fields, by destroying and carrying off a great quantity of corn. They are very easily domesticated, and in captivity are very playful and mischievous. The gray Squirrel is commonly of a fine bluish gray, mingled with a golden colour.

The GREAT TAILED SQUIRREL, so called from the length of its tail, is common on the Missouri. It is of a grayish black colour, and is very graceful and active.

The LINE TAIL SQUIRREL inhabits the Missouri country, where it builds its nest in the holes and crevices of rocks. It is fond of the naked cliffs, where there are but few bushes, and very rarely ascends a tree. It feeds on buds, leaves, and fruits of plants. It is of an ash colour intermixed with white hairs. Its fur is coarse, and the tail which is very long, is marked with three black lines on each side.

The FOUR LINED SQUIRREL is found on the Rocky Mountains. Its nest is composed of a great quantity of the branches of different kinds of trees, and with other vegetable productions. It does not ascend trees by choice. This Squirrel is marked, on the head and back, with white lines. It is exceedingly active and industrious.

The COLUMBIAN PINE SQUIRREL was seen by Lewis and Clark on the banks of the Columbian river, but is supposed by Richardson to be a variety of the Hudson's Bay Squirrel; its habits being similar.

The COMMON RED OR HUDSON'S BAY SQUIRREL is abundant in most parts of North America. It is one of the most lively and nimble of the Squirrel race. It digs burrows at the roots of large trees, to which it forms four or five entrances.

It does not leave its tree in cold and stormy weather, bu when it is sporting in the sunshine, if any one approaches it conceals itself, and makes a loud noise, similar to a watchman's rattle. From this circumstance it has received the name of Chickaree. When pursued, it makes long leaps from tree to tree, and seeks for shelter as soon as possible in its burrow. The skin of this animal is of no value. It is of a reddish brown colour, shaded with black. The ta is long and beautiful.

The RED BELLY SQUIRREL is said to be found near New Orleans. It is of a grey colour above, with a bright yellowish red beneath.

The GROUND OR STRIPED SQUIRREL is abundant in all our woods. It is sometimes called Harkee, and, in New England, is usually denominated the Chip Squirrel. It differs

very much from other Squirrels in its habits. It never makes its nest in the branches of trees, but burrows in the ground near the roots. These burrows extend a considerable distance under ground, and are always provided with two openings. The general colour of this animal is of a reddish brown. On the back there are five black and two white lines, extending the whole length of the body. The head is also marked with stripes.

The COMMON FLYING SQUIRREL* is very abundant in the United States, and is much admired for the softness of its fur, and the gentleness of its disposition. The skin of the sides is extended from the fore to the hind limbs, so as to form a sort of sail, which enables it to descend swiftly from a great height, in the easiest and most

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* Flying Squirrels are said to be found in the north of Europe, but they are very scarce.

THE WEASEL.

THE common Weasel is as frequent in temperate and in hot countries, as it is scarce in cold ones. Though of the same species, it is in many respects different from the ermine, which is a native of the north.

The Weasel is the smallest of the class to which it belongs, and is an active and handsome little animal. Exclusive of the tail it is not seven inches in length; and its height is not more than two and a half. The tail, which is bushy, measures about two inches and a half. The colour of the Weasel is a pale reddish brown on the back and sides, but white under the throat and belly. The eyes are small and black; the ears short and roundish; and the nose is furnished with whiskers, like those of a cat. It moves by unequal leaps, and can spring several feet from the ground, or run up a wall without difficulty.

When a Weasel enters a henroost, it never meddles with the cocks or the old hens; it makes choice of the pullets, the young chickens, and these it kills with a single stroke on the head, and carries away one after another. The eggs it sucks with incredible avidity; making a small hole at one end, through which it licks out the yolk. In winter, it generally resides in some granary, or hayloft; where the female often continues even in the spring, in order to bring forth her young among the hay or straw. During this time, the Weasel makes war with the rats and mice with more success than the cat, since, following them into all their holes, it is next to an impossiblity for them to escape. It also climbs up to the pigeon-houses, to the nests of sparrows, &c. and commits great havock. In summer, it removes to some distance from the houses, always choosing the lower countries about the mills and streams, hiding itself among the bushes, in order to catch the birds, and not unfrequently taking up its habitation in the hollow of an old willow. The female generally brings forth four or five. The young ones come forth with their eyes shut, but in a little time they attain a sufficiency of growth and strength to follow their mother to the chase. They attack adders, water rats, moles, field mice, &c. and, traversing the meadows, devour quails and their eggs.

Like the polecat and the ferret, these animals have so strong a scent that they cannot be kept in any place that is inhabited. As their own smell is very bad, they seem to sustain no inconvenience from any foreign stench or infection. A peasant in my neighbourhood took, one day, three Weasels newly brought forth in the carcass of a wolf which had been suspended by its hind legs from one of the branches of a tree; and though the wolf was almost entirely rotten, the old Weasel, nevertheless, brought grass, straw, and leaves, in order to make a bed for her young ones in the cavity of the thorax. The Weasel may be tamed, and is then very good tempered, and excessively curious.

THE ERMINE, OR STOAT.*

THE weasel with a black tail is called the Ermine when it is white, and the Stoat when it is red or yellowish.

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SQUIRRELS OF AMERICA.

We have selected from Godman and Richardson, the following species of American Squirrels, with a few of the localities and peculiarities of each.

The FOX SQUIRREL is found throughout the southern States, where it frequents the pine forests in considerable numbers, and derives its principal subsistence from the seed of the pine. The nest is placed in the top of a high pine

tree, and is made of twigs and small sticks. The colour of the fox Squirrel varies from white to pale gray and black, and is sometimes mottled, with various shades of red.

The CAT SQUIRREL is one of the largest species, and is found in great abundance in the oak and chesnut forests of the country. It resembles the fox Squirrel in every thing but size, being much larger than that animal. It is a very heavy animal, and is slow in its movements, seldom leaping from tree to tree, unless it is alarmed or closely pursued. It is found of almost every variety of colour.

The BLACK SQUIRREL is very common, but is often confounded with the black varieties of the Squirrels before described. In the winter, this animal is of a pure black; in the summer, it is of a greyish black intermingled with a dark reddish brown. It is found in the United States, and inhabits the northern shores of Lakes Huron and Superior.

The COMMON GRAY SQUIRREL is remarkable for its beauty and activity, and is common throughout the United States. It is generally found in hickory and chesnut woods, where it feeds on nuts, and lays up a hoard for the winter. They construct their nests with care on the tops of tall trees, and seldom leave them during the cold weather. They do a great deal of mischief in the corn fields, by destroying and carrying off a great quantity of corn. They are very easily domesticated, and in captivity are very playful and mischievous. The gray Squirrel is commonly of a fine bluish gray, mingled with a golden colour.

The GREAT TAILED SQUIRREL, so called from the length of its tail, is common on the Missouri. It is of a grayish black colour, and is very graceful and active.

The LINE TAIL SQUIRREL inhabits the Missouri country, where it builds its nest in the holes and crevices of rocks. It is fond of the naked cliffs, where there are but few bushes, and very rarely ascends a tree. It feeds on buds, leaves, and fruits of plants. It is of an ash colour intermixed with white hairs. Its fur is coarse, and the tail which is very long, is marked with three black lines on each side.

The FOUR LINED SQUIRREL is found on the Rocky Mountains. Its nest is composed of a great quantity of the branches of different kinds of trees, and with other vegetable productions. It does not ascend trees by choice. This Squirrel is marked, on the head and back, with white lines. It is exceedingly active and industrious.

The COLUMBIAN PINE SQUIRREL was seen by Lewis and Clark on the banks of the Columbian river, but is supposed by Richardson to be a variety of the Hudson's Bay Squirrel; its habits being similar.

The **COMMON RED** or **HUDSON'S BAY SQUIRREL** is abundant in most parts of North America. It is one of the most lively and nimble of the Squirrel race. It digs burrows at the roots of large trees, to which it forms four or five entrances.

It does not leave its tree in cold and stormy weather, but when it is sporting in the sunshine, if any one approaches, it conceals itself, and makes a loud noise, similar to a watchman's rattle. From this circumstance it has received the name of Chickaree. When pursued, it makes long leaps from tree to tree, and seeks for shelter as soon as possible in its burrow. The skin of this animal is of no value. It is of a reddish brown colour, shaded with black. The tail is long and beautiful.

The **RED BELLY SQUIRREL** is said to be found near New Orleans. It is of a grey colour above, with a bright yellowish red beneath.

The **GROUND** or **STRIPED SQUIRREL** is abundant in all our woods. It is sometimes called Harkee, and, in New England, is usually denominated the Chip Squirrel. It differs

very much from other Squirrels in its habits. It never makes its nest in the branches of trees, but burrows in the ground near the roots. These burrows extend a considerable distance under ground, and are always provided with two openings. The general colour of this animal is of a reddish brown. On the back there are five black and two white lines, extending the whole length of the body. The head is also marked with stripes.

The COMMON FLYING SQUIRREL* is very abundant in the United States, and is much admired for the softness of its fur, and the gentleness of its disposition. The skin of the sides is extended from the fore to the hind limbs, so as to form a sort of sail, which enables it to descend swiftly from a great height, in the easiest and most

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Though it is a less common animal than the Weasel, yet there are numbers to be found in the old forests, and sometimes during the winter in the neighbourhood of woody grounds. It is always easy to distinguish it from the common weasel, because the tip of its tail is uniformly of a deep black, while the edges of its ears, and the extremities of its feet, are white.

CHAP. XII.

Of certain smaller Animals of the carnivorous Class...The Squirrel...The Rat...The Brown Rat...The Water Rat...The Mouse....The Long-tailed Field Mouse...The Short-tailed Field Mouse...The Shrew Mouse...The Water Shrew Mouse...The Bat...The Fat Squirrel... The Garden Squirrel, or Great Dormouse...The common Dormouse...The Guinea Pig...The Mole...The Hedgehog...The Marmot.

THE SQUIRREL.

The common Squirrel of Europe is a beautiful little animal, which is only half wild, and which, by its gentleness, its docility, and even the innocence of its manners, might deserve to be exempted from the present class. It is neither properly a carnivorous nor an injurious animal. though it sometimes seizes on birds; its general food consisting of fruit, almonds, hazle-nuts, beech-mast, and acorns: it is neat, cleanly, alert, lively, and industrious;

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middle and eastern states it is most generally known as the *Weasel.* Farther north it is called *Stoat* in its summer, and Ermine in its winter pelage of pure white. Richardson says that both the Ermine or Stoat, and the common Weasel of Europe are indubitably found in America; the former extending to the most remote arctic districts, and the latter as far north as the Saskatchewan river.

its eyes are large, black, and full of fire, its countenance is sharp, its body is nervous, and its limbs are supple. It is of a bright brown colour, inclining to red; the breast and belly are white; the ears are ornamented with long tufts of hair. The fore feet are strong and sharp, and the fore legs are curiously furnished with long stiff hairs, projecting on each side like whiskers.

The beauty of its form is yet heightened by a spreading tail, in shape like a plume of feathers, which it raises above its head, and forms into a kind of shade for itself.

The Squirrel may be said to be less a quadruped than almost any other four-footed animal. It generally holds itself almost upright, using its fore feet as hands for a conveyance to its mouth. Instead of hiding itself in the earth, it is continually in the air: it somewhat resembles the birds by its lightness and activity; like them, it rests upon the branches of trees; leaping from one to the other, and in the highest of them builds its nest. It avoids the water still more than the earth; and it is even asserted of this animal, that, when it is obliged to cross a river or stream, it uses the bark of a tree, or some such light woody substance, as a boat, while its tail supplies the place of sails, and of a rudder. It gathers together a quantity of nuts during the summer, which it deposits in

the hollow part of some old tree, and to these has recourse for provision in winter; and such is the agility of its body, that it will, in an instant, climb a beech tree, let its bark be ever so smooth.

There are many species which approach to that of the Squirrel, though there are few varieties in the species itself. Some there are of an ash colour, and all the others are red. The small gray Squirrel is of a different species, and remains always gray: and, without mentioning the flying Squirrels, which are very different from the others; the white Squirrel of Cambaye, which is very small, and has a tail like that of the European Squirrel; that of Madagascar, called *Tsitsihi*, which is gray, and which, as Flacourt says, is neither handsome nor fit to be tamed; the white Squirrel of Siam; the gray, and spotted Squirrel of Bengal; the streaked Squirrel of America; the black Squirrel; the gray Virginian Squirrel; the white-striped Squirrel of New Spain; the white Siberian Squirrel; the variegated Squirrel; the little Squirrel of Brazil; that of Barbary; the *palmist*, &c. form so many species entirely distinct and separate from that of which we have been treating.

THE LONG-TAILED SQUIRREL

Is about three times the size of the common Squirrel. It is of a blackish colour, and is a native of Ceylon and Malabar.

THE PALM SQUIRREL.

The Palm Squirrel is a native of the southeastern part of Asia and the neighbouring islands, and is about the size of a rat. It lives upon palm trees. It is a familiar creature, and will enter houses, and pick up crumbs that drop from the table. Its back is variegated with stripes.

GRAY SQUIRREL OF EUROPE.

This animal is nearly the size of the American gray Squirrel. It migrates to immense distances. It crosses rivers on a piece of pine bark, and uses its tail as a sail. It makes its nest in hollow trees; and lays up stores of provisions for winter use, in holes made in the ground.

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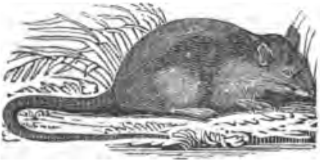
pleasant manner, often passing over a considerable space. This Squirrel is small, of an ash colour above, and white beneath, with large, prominent black eyes. It builds its nest in hollow trees.

The SEVERN RIVER FLYING SQUIRREL is much larger than the species described above, has a longer tail, and is of a different colour. It is found near James' Bay and Lake Huron.

The ROCKY MOUNTAIN FLYING SQUIRREL lives in thick pine forests, and seldom leaves its retreats except at night. It resembles the Severn River Flying Squirrel in form, though its limbs and tail are larger. It is of a yellowish brown colour.

THE RAT.

If we descend by degrees from the great to the small, and from the strong to the weak, we shall find, that Nature has uniformly maintained a balance; that, attentive only to the preservation of each species, she creates a profusion of individuals, and is supported by the numbers which she has formed of a diminutive size, and to which she has denied weapons, strength, and courage.



Under the general name of Rat, several species of small animals have been comprised. The first of these, known in England by the name of the *Black Rat*, where it is indigenous, is carnivorous, and even, if the expression is allowable, *omnivorous*. Hard substances, however, it prefers to soft ones: it devours wool, stuffs, and furniture of all sorts; eats through wood, makes hiding places in walls, thence issues in search of prey, and frequently returns with as much as it is able to drag along with it, forming, especially when it has young ones to provide for, a magazine of the whole. The females bring forth several times in the year, though mostly in the summer season; and they usually produce five or six at a birth.

In defiance of the cats, and notwithstanding the poison, the traps, and every other method that is used to destroy these creatures, they multiply so fast as frequently to do considerable damage. On board a man of war they have been known to consume a hundred weight of biscuits daily,

and when, to destroy them, the ship has been smoked between decks, six hampers a day have for some time been filled with their carcasses. The Isle of France was once abandoned on account of their immense swarms, and, even now, they are a severe scourge to it. In old houses, in the country especially, where great quantities of corn are kept, and where the neighbouring barns and haystacks favour their retreat, as well as their multiplication, they are often so numerous, that the inhabitants would be obliged to remove with their furniture, were they not to devour each other. This we have often, by experience, found to be the case when they have been in any degree straitened for provisions; and the method they take to lessen their numbers, is, for the stronger to fall upon the weaker. This done, they lay open their skulls, and first eat up the brains, afterwards the rest of their body. The next day, hostilities are renewed in the same manner; nor do they suspend their havock till the majority are destroyed. For this reason it is, that, after any place has for a long while been infested with Rats, they often seem to disappear of a sudden, and sometimes for a considerable time.

The female always prepares a bed for her young, and provides them immediately with food. On their first quitting the hole, she watches over, defends, and will even fight the cats, in order to save them. The weasel, though a smaller animal, is, however, a still more formidable enemy than the cat. The Rat cannot inflict any wounds but by snatches, and with his fore teeth, which, however, being rather calculated for gnawing than for biting, have but little strength; whereas the weasel bites fiercely with the force of its whole jaw at once, and, instead of letting go its hold, sucks the blood through the wound. In every conflict with an enemy so dangerous, it is no wonder, therefore, that the Rat should fall a victim. The black Rat has

nearly been exterminated in England by the brown Rat, which was introduced from Norway.*

There are many varieties in the Rat species. The white Rat, like the white mouse, the white rabbit, and all other animals which are entirely of that colour, has red eyes. The white species, with all its varieties, appears to belong to the temperate climates of the eastern continent, and have been diffused in much greater abundance over hot countries than cold ones. Originally they had no Rats in America; and those which are to be found there in such numbers at this day, are the produce of Rats which accidentally obtained a footing there with the first European settlers. Of these the increase was so great, that the Rat was long considered as the pest of the colonies; where, indeed, it had hardly an enemy to oppose it. The European ships have likewise carried these animals to the East Indies, into all the islands of the Indian Archipelago, as well as into Africa, where they are found in great numbers. In the North, on the contrary, they have hardly multiplied beyond Sweden.

THE BROWN RAT

Is both stronger and more mischievous than the black Rat; it has a reddish skin, a long tail, the back bone arched like that of the squirrel, the body much thicker, and whiskers like those of a cat. It is about nine inches long, and has a tail of the same length as the body, covered with minute dusky scales, thickly interspersed with short hairs. It is considerably within half a century since that species

has been spread in the neighbourhood of Paris.* † They multiply indeed prodigiously, since it is well known that they generally produce twelve or fifteen, often sixteen, seventeen, eighteen, and even nineteen young ones at a time. The males are larger, stronger, and more mischievous than the females. When any one pursues, and endeavours to take them, they will turn again, and bite the hand or stick which touches them. Their bite is not only sharp but dangerous, and is immediately followed by a considerable swelling; and the wound, though small, is yet long in being closed. They bring forth three times in a year, the dams previously preparing a bed for their young; and thus two individuals of this species produce at least three dozen in the space of twelve months.

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* Richardson says that "this very destructive animal came, according to the accounts of historians, from Asia to Europe about the beginning of the seventeenth century."

The Brown Rat in its nature, and some of its habitudes, bears a resemblance to the water Rat. Though there is no place in which they will not fix their residence, they yet seem to delight in living near the water. When they find themselves pursued, and have the same opportunity of sheltering themselves in the water, or in a thorny thicket, they prefer the former, plunge into it without dread, and swim with amazing facility. This particularly happens when they cannot get back to their burrows; for they always dig holes for themselves in the earth, or else occupy those of the rabbit. They may also be taken, like that animal, by means of the ferret, which follows them underground in the same manner as it does the rabbit, and seemingly with even more ardour.

These animals live principally upon fruit and corn, but are, notwithstanding, exceedingly carnivorous. They de-

vour young rabbits, partridges, and other birds; and when they enter a hen-roost, they destroy, like the pole-cat, more than they can eat. They do not become torpid in the winter, like the dormouse, but take advantage of every fine day to come out of their subterranean mansions. Those which live in barns drive away the mice; and it has even been remarked in Europe, that the black Rats as they are called, have been far less common since th Brown Rats became so numerous.

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* It has not been known in England above sixty years, though now almost, if not quite, the only species of Rat. Ed.

† Harlan says it was not known in America, till 1775.

THE WATER RAT

Is a little animal, about the size of the black Rat, but in its nature and habits rather resembling the otter than the Rat. Like the otter, it frequents the fresh waters, and is generally found on the borders of rivers, rivulets, and ponds: like that creature, too, it seldom feeds but upon fish, or the spawn of fish, though sometimes it eats frogs, water-insects, and even roots and herbs. This animal is not web-footed; but, though every toe of its feet is separated, it swims with facility, keeps itself a long time above water, and carries off its prey, in order to eat it when it has reached the land.

The head of the Water Rat is shorter, the nose broader, the hair more erect, and the tail much longer than that of the land Rat. On the back it is of a fine raven black; the under part is white, with a black line along the middle. The body is about three inches long. The fur has an astonishing power of resisting water. Like the otter, it flies from large rivers, or rather from those which are too much frequented, and is never found either in houses or in barns.

It is probable, that these animals bring forth often in a year; but of this we have no certain information. Their flesh is not absolutely bad; and, in Catholic countries, the

peasants eat it during the Lent, as they do that of the otter. The species is to be found throughout Europe, the very extremities of the north excepted. In Holland it is devoted to destruction, as one of the most dangerous enemies of the country, in consequence of its burrowing in the dykes.

THE MOUSE

Is an animal smaller than the rat, as also more numerous, and more generally diffused. Its instinct, its temperament, its disposition is the same; nor does it materially differ from the rat, but by its weakness, and the habits which it contracts from that circumstance. By nature timid, by necessity familiar, its fears and its wants are the sole springs of its actions. It never leaves its hiding place but to seek for food; nor does it, like the rat, go from one house to another, unless forced to it, or commit by any means so much mischief. When viewed without the absurd disgust and apprehension which usually accompanies, or is affected at the sight of it, the Mouse is a beautiful creature; its skin is sleek and soft, its eyes bright and lively, all its limbs are formed with exquisite delicacy, and its motions are smart and active. Though one of the most timid of creatures, the Mouse may be taught to repose confidence in mankind, and will quit its place of refuge to receive food. Some few of this species [illegible] of a pure

white color, with large red eyes; but whether they be a permanent kind, or only an accidental variety, cannot well be determined.

But for its immense fecundity, the species of the Mouse could not subsist. Even in mousetraps they have been known to bring forth. They produce at all seasons, and several times in the year. Their usual number at a birth is five or six; and these, in less than fifteen days, attain growth and strength sufficient to run about and shift for themselves. As in these respects they soon attain perfection, so the duration of their life must be very short; a circumstance which cannot but heighten our idea of their prodigious multiplication. Aristotle tells us, that, having put a pregnant Mouse into a vessel of corn, he soon after found in it no less than one hundred and twenty Mice all sprung from one original.*

THE LONG-TAILED FIELD MOUSE

Is smaller than the rat, but larger than the common Mouse, and does not live in houses. It is remarkable for the largeness and prominence of its eyes; it differs likewise both from the rat and the mouse in the color of its skin, which, while it is tolerably white under the belly, is of a reddish brown upon the back. The species is generally and abundantly diffused.

It appears that they are a long time in attaining their full growth, as they vary considerably in size. The largest are rather more than four inches in length, from the tip of the nose to the insertion of the tail; and the smallest, which appear to be full grown as well as the others, are an inch shorter. As there are found many of different inter-

mediate sizes, however, there is no room to doubt but that the larger and the smaller are all of the same species.

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* This animal, like the rat, was introduced into America from Europe.

These creatures are fond of dry and elevated grounds. In woods, and in the fields adjoining to them, they are to be found in great numbers. They conceal themselves in holes, which they either find already made, or which they make for themselves, under bushes, or the trunks of hollow trees. In these they amass so prodigious a quantity of acorns, nuts, &c. that in one single hole there has been found a bushel at a time; and this provision, instead of being proportioned to the wants of the animal, is only so to the capacity of the place allotted for its reception. These holes are generally more than a foot under ground, and often divided into two cells, of which the one serves for a habitation for itself and its young ones, and the other for a granary. The only method of preventing their ravages, which has appeared effectual, is that of setting traps at every tenth pace through the whole extent of each piece of new sown land. There wants no other bait than a roasted nut laid under a flat stone, which is to be supported by a small bit of wood. This they will eagerly attempt to seize; and, being fixed to the wood, no sooner do they touch it, than the stone falls upon them, and stifles or crushes them to death.

THE SHORT-TAILED FIELD MOUSE

Is still more common, more generally diffused than the long-tailed kind, and is found almost every where; in woods, in meadows, and even in gardens. It is remarkable for the thickness of its head, and the shortness of its tail, which is not above an inch in length. It forms holes in the earth, where it hoards up corn, nuts, and acorns; though the former of these it seems to prefer to every other kind of aliment. About the month of July, when

the corn begins to ripen, they flock together from all sides, and frequently do great damage, by cutting the stalk, in order to come at the ear. In autumn and winter, the greater part of them withdraw into the woods, where they find beach-mast, nuts, and acorns. Some years they appear in such great numbers, that they would destroy every thing, were they to subsist for any length of time. For want of other food, however, they often destroy and eat one another, and are themselves the usual prey of the fox, the wild cat, the martin, the weasel, and of the long-tailed field Mouse.

There is another species of field Mouse, called the Harvest Mouse, which is the smallest of British quadrupeds; two of them not weighing more than one halfpenny. This kind makes a beautiful nest, as round as a cricket ball, and about the same size.

AMERICAN FIELD MOUSE.

This little Mouse is very common throughout this country. In its habits and appearance it closely resembles the European field Mouse, and is perhaps only a variety of that animal.

OTHER AMERICAN RATS AND MICE.

Besides those already noticed, there are several other kinds of animals resembling the Rat and Mouse, of which we shall give a brief account.

The Cotton Rat, or Hairy Campagnol, is found in East Florida. It burrows in gardens and in deserted plantations on the banks of rivers. It derives its name from the circumstance of its making its nest of cotton, which it collects in great quantities. The nest is placed generally in a hollow log.

The **Jumping Mouse**, when not in motion, might be mistaken for the field Mouse. It is found from Canada to Pennsylvania, and is of the size of the common Mouse. It is of a reddish brown colour, and has very short fore legs. Its hind legs are of great length, and enable it to leap over five or six feet of ground at every spring. When pursued, its movements are like those of a bird, so high does it leap, and so light and quick is its ascent and descent. It runs also with speed, and it is in vain to attempt to catch it.

These animals remain torpid during the winter, wrapping themselves in a coat of clay, so curiously as to conceal itself entirely. In the spring they sally forth into the grain and grass fields, and do considerable mischief to the farmers by their depredations.

The **Labrador Jumping Mouse** closely resembles the preceding species in its habits, and is a very common animal in the fur countries, as far north as Slave Lake. It is of a brown colour above, and white beneath.

The **Wood-Rat** is found in Florida and Missouri. It burrows under stones, and among the ruins of old buildings, and builds its nest of large quantities of rubbish. It is peculiarly inoffensive in its habits, and is of a timid and gentle disposition. This animal is said to construct its habitations with great labor, raising pyramids three or four feet high, of dry branches, so interwoven that it is very difficult to destroy them.

Of the **Meadow Mouse** there are five kinds, viz. **Bank Mouse**, **Yellow-Cheeked**, **Wilson's**, **Sharp-Nosed**, and **Northern**. They all resemble each other in form and colour, though they differ somewhat in their habits. Richardson supposes there are still other species.

POUCHED RATS.

These animals, of which there are several kinds, have a strong resemblance to the mole. The common Pouched Rat is found in abundance in Florida, Georgia, and Missouri, and their burrows are so numerous, as to give the ground where they are made, the appearance of ploughed land, a small hillock of earth being raised over each burrow. By the aid of its long claws, this animal is enabled to make its way under ground with great rapidity. But little is known of its habits, as it is peculiarly vigilant, and seldom makes its appearance in the day time. It takes its name from the pouches which it has on the cheeks, which give it a very singular appearance.

Richardson mentions four other kinds of Rats with cheek pouches, viz. Columbia Sand-Rat, Lead Beater's Sand-Rat, Canada Pouched Rat, and mole-shaped Sand-Rat. These all burrow in the ground like the mole.

and when, to destroy them, the ship has been smoked between decks, six hampers a day have for some time been filled with their carcasses. The Isle of France was once abandoned on account of their immense swarms, and, even now, they are a severe scourge to it. In old houses, in the country especially, where great quantities of corn are kept, and where the neighbouring barns and haystacks favour their retreat, as well as their multiplication, they are often so numerous, that the inhabitants would be obliged to remove with their furniture, were they not to devour each other. This we have often, by experience, found to be the case when they have been in any degree straitened for provisions; and the method they take to lessen their numbers, is, for the stronger to fall upon the weaker. This done, they lay open their skulls, and first eat up the brains, afterwards the rest of their body. The next day, hostilities are renewed in the same manner; nor do they suspend their havock till the majority are destroyed. For this reason it is, that, after any place has for a long while been infested with Rats, they often seem to disappear of a sudden, and sometimes for a considerable time.

The female always prepares a bed for her young, and provides them immediately with food. On their first quitting the hole, she watches over, defends, and will even fight the cats, in order to save them. The weasel, though a smaller animal, is, however, a still more formidable enemy than the cat. The Rat cannot inflict any wounds but by snatches, and with his fore teeth, which, however, being rather calculated for gnawing than for biting, have but little strength; whereas the weasel bites fiercely with the force of its whole jaw at once, and, instead of letting go its hold, sucks the blood through the wound. In every conflict with an enemy so dangerous, it is no wonder, therefore, that the Rat should fall a victim. The black Rat has

nearly been exterminated in England by the brown Rat, which was introduced from Norway.*

There are many varieties in the Rat species. The white Rat, like the white mouse, the white rabbit, and all other animals which are entirely of that colour, has red eyes. The white species, with all its varieties, appears to belong to the temperate climates of the eastern continent, and have been diffused in much greater abundance over hot countries than cold ones. Originally they had no Rats in America; and those which are to be found there in such numbers at this day, are the produce of Rats which accidentally obtained a footing there with the first European settlers. Of these the increase was so great, that the Rat was long considered as the pest of the colonies; where, indeed, it had hardly an enemy to oppose it. The European ships have likewise carried these animals to the East Indies, into all the islands of the Indian Archipelago, as well as into Africa, where they are found in great numbers. In the North, on the contrary, they have hardly multiplied beyond Sweden.

THE BROWN RAT

Is both stronger and more mischievous than the black Rat; it has a reddish skin, a long tail, the back bone arched like that of the squirrel, the body much thicker, and whiskers like those of a cat. It is about nine inches long, and has a tail of the same length as the body, covered with minute dusky scales, thickly interspersed with short hairs. It is considerably within half a century since that species

has been spread in the neighbourhood of Paris.[*] [†] They multiply indeed prodigiously, since it is well known that they generally produce twelve or fifteen, often sixteen, seventeen, eighteen, and even nineteen young ones at a time. The males are larger, stronger, and more mischievous than the females. When any one pursues, and endeavours to take them, they will turn again, and bite the hand or stick which touches them. Their bite is not only sharp but dangerous, and is immediately followed by a considerable swelling; and the wound, though small, is yet long in being closed. They bring forth three times in a year, the dams previously preparing a bed for their young; and thus two individuals of this species produce at least three dozen in the space of twelve months.

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* Richardson says that "this very destructive animal came, according to the accounts of historians, from Asia to Europe about the beginning of the seventeenth century."

The Brown Rat in its nature, and some of its habitudes, bears a resemblance to the water Rat. Though there is no place in which they will not fix their residence, they yet seem to delight in living near the water. When they find themselves pursued, and have the same opportunity of sheltering themselves in the water, or in a thorny thicket, they prefer the former, plunge into it without dread, and swim with amazing facility. This particularly happens when they cannot get back to their burrows; for they always dig holes for themselves in the earth, or else occupy those of the rabbit. They may also be taken, like that animal, by means of the ferret, which follows them underground in the same manner as it does the rabbit, and seemingly with even more ardour.

These animals live principally upon fruit and corn, but are, notwithstanding, exceedingly carnivorous. They de-

vour young rabbits, partridges, and other birds; and when they enter a hen-roost, they destroy, like the pole-cat, more than they can eat. They do not become torpid in the winter, like the dormouse, but take advantage of every fine day to come out of their subterranean mansions. Those which live in barns drive away the mice; and it has even been remarked in Europe, that the black Rats as they are called, have been far less common since th Brown Rats became so numerous.

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[*] It has not been known in England above sixty years, though now almost, if not quite, the only species of Rat. ED.

[†] Harlan says it was not known in America, till 1775.

THE WATER RAT

Is a little animal, about the size of the black Rat, but in its nature and habits rather resembling the otter than the Rat. Like the otter, it frequents the fresh waters, and is generally found on the borders of rivers, rivulets, and ponds: like that creature, too, it seldom feeds but upon fish, or the spawn of fish, though sometimes it eats frogs, water-insects, and even roots and herbs. This animal is not web-footed; but, though every toe of its feet is separated, it swims with facility, keeps itself a long time above water, and carries off its prey, in order to eat it when it has reached the land.

The head of the Water Rat is shorter, the nose broader, the hair more erect, and the tail much longer than that of the land Rat. On the back it is of a fine raven black; the under part is white, with a black line along the middle. The body is about three inches long. The fur has an astonishing power of resisting water. Like the otter, it flies from large rivers, or rather from those which are too much frequented, and is never found either in houses or in barns.

It is probable, that these animals bring forth often in a year; but of this we have no certain information. Their flesh is not absolutely bad; and, in Catholic countries, the

peasants eat it during the Lent, as they do that of the otter. The species is to be found throughout Europe, the very extremities of the north excepted. In Holland it is devoted to destruction, as one of the most dangerous enemies of the country, in consequence of its burrowing in the dykes.

THE MOUSE

Is an animal smaller than the rat, as also more numerous, and more generally diffused. Its instinct, its temperament, its disposition is the same; nor does it materially differ from the rat, but by its weakness, and the habits which it contracts from that circumstance. By nature timid, by necessity familiar, its fears and its wants are the sole springs of its actions. It never leaves its hiding place but to seek for food; nor does it, like the rat, go from one house to another, unless forced to it, or commit by any means so much mischief. When viewed without the absurd disgust and apprehension which usually accompanies, or is affected at the sight of it, the Mouse is a beautiful creature; its skin is sleek and soft, its eyes bright and lively, all its limbs are formed with exquisite delicacy, and its motions are smart and active. Though one of the most timid of creatures, the Mouse may be taught to repose confidence in mankind, and will quit its place of refuge to receive food. Some few of this species are of a pure

white color, with large red eyes; but whether they be a permanent kind, or only an accidental variety, cannot well be determined.

But for its immense fecundity, the species of the Mouse could not subsist. Even in mousetraps they have been known to bring forth. They produce at all seasons, and several times in the year. Their usual number at a birth is five or six; and these, in less than fifteen days, attain growth and strength sufficient to run about and shift for themselves. As in these respects they soon attain perfection, so the duration of their life must be very short; a circumstance which cannot but heighten our idea of their prodigious multiplication. Aristotle tells us, that, having put a pregnant Mouse into a vessel of corn, he soon after found in it no less than one hundred and twenty Mice all sprung from one original.*

THE LONG-TAILED FIELD MOUSE

Is smaller than the rat, but larger than the common Mouse, and does not live in houses. It is remarkable for the largeness and prominence of its eyes; it differs likewise both from the rat and the mouse in the color of its skin, which, while it is tolerably white under the belly, is of a reddish brown upon the back. The species is generally and abundantly diffused.

It appears that they are a long time in attaining their full growth, as they vary considerably in size. The largest are rather more than four inches in length, from the tip of the nose to the insertion of the tail; and the smallest, which appear to be full grown as well as the others, are an inch shorter. As there are found many of different inter-

mediate sizes, however, there is no room to doubt but that the larger and the smaller are all of the same species.

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* This animal, like the rat, was introduced into America from Europe.

These creatures are fond of dry and elevated grounds. In woods, and in the fields adjoining to them, they are to be found in great numbers. They conceal themselves in holes, which they either find already made, or which they make for themselves, under bushes, or the trunks of hollow trees. In these they amass so prodigious a quantity of acorns, nuts, &c. that in one single hole there has been found a bushel at a time; and this provision, instead of being proportioned to the wants of the animal, is only so to the capacity of the place allotted for its reception. These holes are generally more than a foot under ground, and often divided into two cells, of which the one serves for a habitation for itself and its young ones, and the other for a granary. The only method of preventing their ravages, which has appeared effectual, is that of setting traps at every tenth pace through the whole extent of each piece of new sown land. There wants no other bait than a roasted nut laid under a flat stone, which is to be supported by a small bit of wood. This they will eagerly attempt to seize; and, being fixed to the wood, no sooner do they touch it, than the stone falls upon them, and stifles or crushes them to death.

THE SHORT-TAILED FIELD MOUSE

Is still more common, more generally diffused than the long-tailed kind, and is found almost every where; in woods, in meadows, and even in gardens. It is remarkable for the thickness of its head, and the shortness of its tail, which is not above an inch in length. It forms holes in the earth, where it hoards up corn, nuts, and acorns; though the former of these it seems to prefer to every other kind of aliment. About the month of July, when

the corn begins to ripen, they flock together from all sides, and frequently do great damage, by cutting the stalk, in order to come at the ear. In autumn and winter, the greater part of them withdraw into the woods, where they find beach-mast, nuts, and acorns. Some years they appear in such great numbers, that they would destroy every thing, were they to subsist for any length of time. For want of other food, however, they often destroy and eat one another, and are themselves the usual prey of the fox, the wild cat, the martin, the weasel, and of the long-tailed field Mouse.

There is another species of field Mouse, called the Harvest Mouse, which is the smallest of British quadrupeds; two of them not weighing more than one halfpenny. This kind makes a beautiful nest, as round as a cricket ball, and about the same size.

AMERICAN FIELD MOUSE.

This little Mouse is very common throughout this country. In its habits and appearance it closely resembles the European field Mouse, and is perhaps only a variety of that animal.

OTHER AMERICAN RATS AND MICE.

Besides those already noticed, there are several other kinds of animals resembling the Rat and Mouse, of which we shall give a brief account.

The Cotton Rat, or Hairy Campagnol, is found in East Florida. It burrows in gardens and in deserted plantations on the banks of rivers. It derives its name from the circumstance of its making its nest of cotton, which it collects in great quantities. The nest is placed generally in a hollow log.

The **Jumping Mouse**, when not in motion, might be mistaken for the field Mouse. It is found from Canada to Pennsylvania, and is of the size of the common Mouse. It is of a reddish brown colour, and has very short fore legs. Its hind legs are of great length, and enable it to leap over five or six feet of ground at every spring. When pursued, its movements are like those of a bird, so high does it leap, and so light and quick is its ascent and descent. It runs also with speed, and it is in vain to attempt to catch it.

These animals remain torpid during the winter, wrapping themselves in a coat of clay, so curiously as to conceal itself entirely. In the spring they sally forth into the grain and grass fields, and do considerable mischief to the farmers by their depredations.

The **Labrador Jumping Mouse** closely resembles the preceding species in its habits, and is a very common animal in the fur countries, as far north as Slave Lake. It is of a brown colour above, and white beneath.

The **Wood-Rat** is found in Florida and Missouri. It burrows under stones, and among the ruins of old buildings, and builds its nest of large quantities of rubbish. It is peculiarly inoffensive in its habits, and is of a timid and gentle disposition. This animal is said to construct its habitations with great labor, raising pyramids three or four feet high, of dry branches, so interwoven that it is very difficult to destroy them.

Of the **Meadow Mouse** there are five kinds, viz. **Bank Mouse, Yellow-Cheeked, Wilson's, Sharp-Nosed,** and **Northern.** They all resemble each other in form and colour, though they differ somewhat in their habits. Richardson supposes there are still other species.

POUCHED RATS.

These animals, of which there are several kinds, have a strong resemblance to the mole. The common Pouched Rat is found in abundance in Florida, Georgia, and Missouri, and their burrows are so numerous, as to give the ground where they are made, the appearance of ploughed land, a small hillock of earth being raised over each burrow. By the aid of its long claws, this animal is enabled to make its way under ground with great rapidity. But little is known of its habits, as it is peculiarly vigilant, and seldom makes its appearance in the day time. It takes its name from the pouches which it has on the cheeks, which give it a very singular appearance.

Richardson mentions four other kinds of Rats with cheek pouches, viz. Columbia Sand-Rat, Lead Beater's Sand-Rat, Canada Pouched Rat, and mole-shaped Sand-Rat. These all burrow in the ground like the mole.

and when, to destroy them, the ship has been smoked between decks, six hampers a day have for some time been filled with their carcasses. The Isle of France was once abandoned on account of their immense swarms, and, even now, they are a severe scourge to it. In old houses, in the country especially, where great quantities of corn are kept, and where the neighbouring barns and haystacks favour their retreat, as well as their multiplication, they are often so numerous, that the inhabitants would be obliged to remove with their furniture, were they not to devour each other. This we have often, by experience, found to be the case when they have been in any degree straitened for provisions; and the method they take to lessen their numbers, is, for the stronger to fall upon the weaker. This done, they lay open their skulls, and first eat up the brains, afterwards the rest of their body. The next day, hostilities are renewed in the same manner; nor do they suspend their havock till the majority are destroyed. For this reason it is, that, after any place has for a long while been infested with Rats, they often seem to disappear of a sudden, and sometimes for a considerable time.

The female always prepares a bed for her young, and provides them immediately with food. On their first quitting the hole, she watches over, defends, and will even fight the cats, in order to save them. The weasel, though a smaller animal, is, however, a still more formidable enemy than the cat. The Rat cannot inflict any wounds but by snatches, and with his fore teeth, which, however, being rather calculated for gnawing than for biting, have but little strength; whereas the weasel bites fiercely with the force of its whole jaw at once, and, instead of letting go its hold, sucks the blood through the wound. In every conflict with an enemy so dangerous, it is no wonder, therefore, that the Rat should fall a victim. The black Rat has

nearly been exterminated in England by the brown Rat, which was introduced from Norway.*

There are many varieties in the Rat species. The white Rat, like the white mouse, the white rabbit, and all other animals which are entirely of that colour, has red eyes. The white species, with all its varieties, appears to belong to the temperate climates of the eastern continent, and have been diffused in much greater abundance over hot countries than cold ones. Originally they had no Rats in America; and those which are to be found there in such numbers at this day, are the produce of Rats which accidentally obtained a footing there with the first European settlers. Of these the increase was so great, that the Rat was long considered as the pest of the colonies; where, indeed, it had hardly an enemy to oppose it. The European ships have likewise carried these animals to the East Indies, into all the islands of the Indian Archipelago, as well as into Africa, where they are found in great numbers. In the North, on the contrary, they have hardly multiplied beyond Sweden.

THE BROWN RAT

Is both stronger and more mischievous than the black Rat; it has a reddish skin, a long tail, the back bone arched like that of the squirrel, the body much thicker, and whiskers like those of a cat. It is about nine inches long, and has a tail of the same length as the body, covered with minute dusky scales, thickly interspersed with short hairs. It is considerably within half a century since that species

has been spread in the neighbourhood of Paris.* † They multiply indeed prodigiously, since it is well known that they generally produce twelve or fifteen, often sixteen, seventeen, eighteen, and even nineteen young ones at a time. The males are larger, stronger, and more mischievous than the females. When any one pursues, and endeavours to take them, they will turn again, and bite the hand or stick which touches them. Their bite is not only sharp but dangerous, and is immediately followed by a considerable swelling; and the wound, though small, is yet long in being closed. They bring forth three times in a year, the dams previously preparing a bed for their young; and thus two individuals of this species produce at least three dozen in the space of twelve months.

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* Richardson says that "this very destructive animal came, according to the accounts of historians, from Asia to Europe about the beginning of the seventeenth century."

The Brown Rat in its nature, and some of its habitudes, bears a resemblance to the water Rat. Though there is no place in which they will not fix their residence, they yet seem to delight in living near the water. When they find themselves pursued, and have the same opportunity of sheltering themselves in the water, or in a thorny thicket, they prefer the former, plunge into it without dread, and swim with amazing facility. This particularly happens when they cannot get back to their burrows; for they always dig holes for themselves in the earth, or else occupy those of the rabbit. They may also be taken, like that animal, by means of the ferret, which follows them underground in the same manner as it does the rabbit, and seemingly with even more ardour.

These animals live principally upon fruit and corn, but are, notwithstanding, exceedingly carnivorous. They de-

vour young rabbits, partridges, and other birds; and when they enter a hen-roost, they destroy, like the pole-cat, more than they can eat. They do not become torpid in the winter, like the dormouse, but take advantage of every fine day to come out of their subterranean mansions. Those which live in barns drive away the mice; and it has even been remarked in Europe, that the black Rats as they are called, have been far less common since th Brown Rats became so numerous.

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THE WATER RAT

Is a little animal, about the size of the black Rat, but in its nature and habits rather resembling the otter than the Rat. Like the otter, it frequents the fresh waters, and is generally found on the borders of rivers, rivulets, and ponds: like that creature, too, it seldom feeds but upon fish, or the spawn of fish, though sometimes it eats frogs, water-insects, and even roots and herbs. This animal is not web-footed; but, though every toe of its feet is separated, it swims with facility, keeps itself a long time above water, and carries off its prey, in order to eat it when it has reached the land.

The head of the Water Rat is shorter, the nose broader, the hair more erect, and the tail much longer than that of the land Rat. On the back it is of a fine raven black; the under part is white, with a black line along the middle. The body is about three inches long. The fur has an astonishing power of resisting water. Like the otter, it flies from large rivers, or rather from those which are too much frequented, and is never found either in houses or in barns.

It is probable, that these animals bring forth often in a year; but of this we have no certain information. Their flesh is not absolutely bad; and, in Catholic countries, the

peasants eat it during the Lent, as they do that of the otter. The species is to be found throughout Europe, the very extremities of the north excepted. In Holland it is devoted to destruction, as one of the most dangerous enemies of the country, in consequence of its burrowing in the dykes.

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THE LONG-TAILED FIELD MOUSE

Is smaller than the rat, but larger than the common Mouse, and does not live in houses. It is remarkable for the largeness and prominence of its eyes; it differs likewise both from the rat and the mouse in the color of its skin, which, while it is tolerably white under the belly, is of a reddish brown upon the back. The species is generally and abundantly diffused.

It appears that they are a long time in attaining their full growth, as they vary considerably in size. The largest are rather more than four inches in length, from the tip of the nose to the insertion of the tail; and the smallest, which appear to be full grown as well as the others, are an inch shorter. As there are found many of different inter-

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* This animal, like the rat, was introduced into America from Europe.

These creatures are fond of dry and elevated grounds. In woods, and in the fields adjoining to them, they are to be found in great numbers. They conceal themselves in holes, which they either find already made, or which they make for themselves, under bushes, or the trunks of hollow trees. In these they amass so prodigious a quantity of acorns, nuts, &c. that in one single hole there has been found a bushel at a time; and this provision, instead of being proportioned to the wants of the animal, is only so to the capacity of the place allotted for its reception. These holes are generally more than a foot under ground, and often divided into two cells, of which the one serves for a habitation for itself and its young ones, and the other for a granary. The only method of preventing their ravages, which has appeared effectual, is that of setting traps at every tenth pace through the whole extent of each piece of new sown land. There wants no other bait than a roasted nut laid under a flat stone, which is to be supported by a small bit of wood. This they will eagerly attempt to seize; and, being fixed to the wood, no sooner do they touch it, than the stone falls upon them, and stifles or crushes them to death.

THE SHORT-TAILED FIELD MOUSE

Is still more common, more generally diffused than the long-tailed kind, and is found almost every where; in woods, in meadows, and even in gardens. It is remarkable for the thickness of its head, and the shortness of its tail, which is not above an inch in length. It forms holes in the earth, where it hoards up corn, nuts, and acorns; though the former of these it seems to prefer to every other kind of aliment. About the month of July, when

the corn begins to ripen, they flock together from all sides, and frequently do great damage, by cutting the stalk, in order to come at the ear. In autumn and winter, the greater part of them withdraw into the woods, where they find beach-mast, nuts, and acorns. Some years they appear in such great numbers, that they would destroy every thing, were they to subsist for any length of time. For want of other food, however, they often destroy and eat one another, and are themselves the usual prey of the fox, the wild cat, the martin, the weasel, and of the long-tailed field Mouse.

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THIS little Mouse is very common throughout this country. In its habits and appearance it closely resembles the European field Mouse, and is perhaps only a variety of that animal.

OTHER AMERICAN RATS AND MICE.

BESIDES those already noticed, there are several other kinds of animals resembling the Rat and Mouse, of which we shall give a brief account.

The COTTON RAT, or Hairy Campagnol, is found in East Florida. It burrows in gardens and in deserted plantations on the banks of rivers. It derives its name from the circumstance of its making its nest of cotton, which it collects in great quantities. The nest is placed generally in a hollow log.

The **Jumping Mouse**, when not in motion, might be mistaken for the field Mouse. It is found from Canada to Pennsylvania, and is of the size of the common Mouse. It is of a reddish brown colour, and has very short fore legs. Its hind legs are of great length, and enable it to leap over five or six feet of ground at every spring. When pursued, its movements are like those of a bird, so high does it leap, and so light and quick is its ascent and descent. It runs also with speed, and it is in vain to attempt to catch it.

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POUCHED RATS.

These animals, of which there are several kinds, have a strong resemblance to the mole. The common Pouched Rat is found in abundance in Florida, Georgia, and Missouri, and their burrows are so numerous, as to give the ground where they are made, the appearance of ploughed land, a small hillock of earth being raised over each burrow. By the aid of its long claws, this animal is enabled to make its way under ground with great rapidity. But little is known of its habits, as it is peculiarly vigilant, and seldom makes its appearance in the day time. It takes its name from the pouches which it has on the cheeks, which give it a very singular appearance.

Richardson mentions four other kinds of Rats with cheek pouches, viz. Columbia Sand-Rat, Lead Beater's Sand-Rat, Canada Pouched Rat, and mole-shaped Sand-Rat. These all burrow in the ground like the mole.

CAMAS RAT, OR GOPHER.

This animal is found on the Columbia and Missouri rivers. It lives beneath the surface of the earth, and eats roots. The head appears large and clumsy, owing to its cheek pouches. The root of the Camas plant is its favorite food, from which it derives its name. It is said by Schoolcraft, to employ its pouches in carrying dirt out of its hole, and Richardson adopts this account as true; but an intelligent individual, who has spent much time in the country which it frequents, assures us that he has often seen the Gopher at work, and that it brings up the dirt with its broad feet. The quantity that it will throw out in a short space of time, is truly astonishing.

THE SHREW MOUSE

Seems to form a shade in the order of small animals, and to fill up the vacuum between the rat and the mole. The Shrew Mouse is smaller still than the domestic Mouse, and resembles the mole in its snout, which is longer than its jaw bones; in its eyes, which, though rather larger than those of the mole, are, however, in like manner concealed, and much smaller than those of the domestic Mouse; in the number of its claws, of which it has five to each foot; in its tail, and its legs, particularly those behind, which are shorter than those of the domestic Mouse; and, lastly, in its ears, and in its teeth.

This diminutive creature has a strong smell, which is peculiar to itself, and so offensive to cats, that, though they will cheerfully chase and kill the Shrew Mouse, they yet will not eat its flesh like that of the domestic Mouse. It is evidently this noisome odour, this aversion of the cat to it, that gave rise to the notion, that the Shrew Mouse is a venomous animal, and that its bite is so dan-

gerous to cattle of all sorts, and particularly to horses. The truth, however, is, that it is neither venomous nor capable of biting; for it cannot open its mouth sufficiently wide to seize the double thickness of the skin, which is absolutely necessary, in order to bite. The distemper among horses, it is farther to be observed, which the vulgar attribute to the tooth of the Shrew Mouse, is a swelling which proceeds from an internal cause, and has no connection with any bite, or rather scratch, that this little animal may give.

In winter especially, the Shrew Mouse generally fixes its residence in some hayloft, stable, or barn, where it feeds on grain, insects, and putrified flesh. It is likewise found in woods and fields, where, living on corn, it sometimes conceals itself under moss or leaves, sometimes under the trunks of trees, sometimes in holes abandoned by moles, and sometimes in holes of a smaller size, which it forms for itself by digging with its claws and snout.

The Shrew Mouse produces, it is said, as many at a birth as the domestic Mouse, though less frequently. It has a squeak much more sharp and piercing than the latter. In point of nimbleness, however, it is far inferior; and as it both sees imperfectly, and runs slowly, there is little difficulty in taking it.

The usual colour of these creatures is brown, with a mixture of red; others of them are ash-coloured; and in all there is a greater or less degree of whiteness upon the belly. They are very common throughout Europe; and in America, there are several species of a small size. Among them are the **SMALL SHREW** and the **SHORT-TAIL SHREW**. The first is found on the Missouri, and the latter on the Rocky Mountains. Godman mentions a third species, and Richardson notices two others, **AMERICAN MARSH SHREW**, and **FOSTERS SHREW MOUSE**.

THE WATER SHREW MOUSE,

THOUGH a native of Europe was yet unknown to any of the naturalists, till M. Daubenton first discovered it. Every thing necessary to be added here, with respect to the Water Shrew Mouse, is, that it is taken at the sources of fountains, in the morning and evening, as the sun rises and sets; that in the day time it remains concealed in the clefts of rocks, or in holes under ground, near the edges of rivulets; that it brings forth in spring, and commonly produces nine young ones at a time.

THE CHINCHILLA.

THIS interesting animal, which produces the fur which passes under its name, is a species of Field Mouse, and is common in the high plains of Chili and Peru. It is about nine inches in length, and has a tail about half the length of its body. It sits upon its haunches, and takes its food in its fore paws like a squirrel. It feeds chiefly upon bulbous roots.

THE BAT.

An animal, which, like the Bat, is half quadruped and half bird, and which, in fact, is neither the one nor the other, is a kind of monster. In the Bat, the fore feet are, properly speaking, neither wings nor feet, though the animal uses them for the purpose of flying, and occasionally of moving along upon the ground. They are, in fact, two shapeless extremities, of which the bones are of a monstrous length, and connected by a membrane, not covered with feathers, or even with hair, like the rest of the body: they are a kind of winged paws, or hands, ten times larger than the feet, and, in all, four times longer than the whole ength of the body of the animal: they are, in a word, parts which have rather the appearance of a capricious and acidental, than a regular and determined production.

To these incongruities, these disproportions of the body nd members, may be added the still more striking deormities of the head. In some species, the nose is hardly isible, the eyes are sunk near the tip of the ear, and are onfounded with the cheeks; in others, the ears are as ong as the body, or else the face is twisted into the form f a horse-shoe, and the nose covered with a kind of crust. verse, likewise, to the society of all other creatures, they hun the light, inhabit none but dark and gloomy places, o which, after their nocturnal excursions, they are sure to eturn by break of day, and in which they remain, fixed, as were, to the walls, till night again approaches.

Their motion in the air is with less propriety to be term-

peasants eat it during the Lent, as they do that of the otter. The species is to be found throughout Europe, the very extremities of the north excepted. In Holland it is devoted to destruction, as one of the most dangerous enemies of the country, in consequence of its burrowing in the dykes.

THE MOUSE

Is an animal smaller than the rat, as also more numerous, and more generally diffused. Its instinct, its temperament, its disposition is the same; nor does it materially differ from the rat, but by its weakness, and the habits which it contracts from that circumstance. By nature timid, by necessity familiar, its fears and its wants are the sole springs of its actions. It never leaves its hiding place but to seek for food; nor does it, like the rat, go from one house to another, unless forced to it, or commit by any means so much mischief. When viewed without the absurd disgust and apprehension which usually accompanies, or is affected at the sight of it, the Mouse is a beautiful creature; its skin is sleek and soft, its eyes bright and lively, all its limbs are formed with exquisite delicacy, and its motions are smart and active. Though one of the most timid of creatures, the Mouse may be taught to repose confidence in mankind, and will quit its place of refuge to receive food. Some few of this species are of a pure

white color, with large red eyes; but whether they be a permanent kind, or only an accidental variety, cannot well be determined.

But for its immense fecundity, the species of the Mouse could not subsist. Even in mousetraps they have been known to bring forth. They produce at all seasons, and several times in the year. Their usual number at a birth is five or six; and these, in less than fifteen days, attain growth and strength sufficient to run about and shift for themselves. As in these respects they soon attain perfection, so the duration of their life must be very short; a circumstance which cannot but heighten our idea of their prodigious multiplication. Aristotle tells us, that, having put a pregnant Mouse into a vessel of corn, he soon after found in it no less than one hundred and twenty Mice all sprung from one original.*

THE LONG-TAILED FIELD MOUSE

Is smaller than the rat, but larger than the common Mouse, and does not live in houses. It is remarkable for the largeness and prominence of its eyes; it differs likewise both from the rat and the mouse in the color of its skin, which, while it is tolerably white under the belly, is of a reddish brown upon the back. The species is generally and abundantly diffused.

It appears that they are a long time in attaining their full growth, as they vary considerably in size. The largest are rather more than four inches in length, from the tip of the nose to the insertion of the tail; and the smallest, which appear to be full grown as well as the others, are an inch shorter. As there are found many of different inter-

mediate sizes, however, there is no room to doubt but that the larger and the smaller are all of the same species.

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* This animal, like the rat, was introduced into America from Europe.

These creatures are fond of dry and elevated grounds. In woods, and in the fields adjoining to them, they are to be found in great numbers. They conceal themselves in holes, which they either find already made, or which they make for themselves, under bushes, or the trunks of hollow trees. In these they amass so prodigious a quantity of acorns, nuts, &c. that in one single hole there has been found a bushel at a time; and this provision, instead of being proportioned to the wants of the animal, is only so to the capacity of the place allotted for its reception. These holes are generally more than a foot under ground, and often divided into two cells, of which the one serves for a habitation for itself and its young ones, and the other for a granary. The only method of preventing their ravages, which has appeared effectual, is that of setting traps at every tenth pace through the whole extent of each piece of new sown land. There wants no other bait than a roasted nut laid under a flat stone, which is to be supported by a small bit of wood. This they will eagerly attempt to seize; and, being fixed to the wood, no sooner do they touch it, than the stone falls upon them, and stifles or crushes them to death.

THE SHORT-TAILED FIELD MOUSE

Is still more common, more generally diffused than the long-tailed kind, and is found almost every where; in woods, in meadows, and even in gardens. It is remarkable for the thickness of its head, and the shortness of its tail, which is not above an inch in length. It forms holes in the earth, where it hoards up corn, nuts, and acorns; though the former of these it seems to prefer to every other kind of aliment. About the month of July, when

the corn begins to ripen, they flock together from all sides, and frequently do great damage, by cutting the stalk, in order to come at the ear. In autumn and winter, the greater part of them withdraw into the woods, where they find beach-mast, nuts, and acorns. Some years they appear in such great numbers, that they would destroy every thing, were they to subsist for any length of time. For want of other food, however, they often destroy and eat one another, and are themselves the usual prey of the fox, the wild cat, the martin, the weasel, and of the long-tailed field Mouse.

There is another species of field Mouse, called the **Harvest Mouse**, which is the smallest of British quadrupeds; two of them not weighing more than one halfpenny. This kind makes a beautiful nest, as round as a cricket ball, and about the same size.

AMERICAN FIELD MOUSE.

This little Mouse is very common throughout this country. In its habits and appearance it closely resembles the European field Mouse, and is perhaps only a variety of that animal.

OTHER AMERICAN RATS AND MICE.

Besides those already noticed, there are several other kinds of animals resembling the Rat and Mouse, of which we shall give a brief account.

The **Cotton Rat**, or Hairy Campagnol, is found in East Florida. It burrows in gardens and in deserted plantations on the banks of rivers. It derives its name from the circumstance of its making its nest of cotton, which it collects in great quantities. The nest is placed generally in a hollow log.

The **Jumping Mouse**, when not in motion, might be mistaken for the field Mouse. It is found from Canada to Pennsylvania, and is of the size of the common Mouse. It is of a reddish brown colour, and has very short fore legs. Its hind legs are of great length, and enable it to leap over five or six feet of ground at every spring. When pursued, its movements are like those of a bird, so high does it leap, and so light and quick is its ascent and descent. It runs also with speed, and it is in vain to attempt to catch it.

These animals remain torpid during the winter, wrapping themselves in a coat of clay, so curiously as to conceal itself entirely. In the spring they sally forth into the grain and grass fields, and do considerable mischief to the farmers by their depredations.

The **Labrador Jumping Mouse** closely resembles the preceding species in its habits, and is a very common animal in the fur countries, as far north as Slave Lake. It is of a brown colour above, and white beneath.

The **Wood-Rat** is found in Florida and Missouri. It burrows under stones, and among the ruins of old buildings, and builds its nest of large quantities of rubbish. It is peculiarly inoffensive in its habits, and is of a timid and gentle disposition. This animal is said to construct its habitations with great labor, raising pyramids three or four feet high, of dry branches, so interwoven that it is very difficult to destroy them.

Of the **Meadow Mouse** there are five kinds, viz. **Bank Mouse**, **Yellow-Cheeked**, **Wilson's**, **Sharp-Nosed**, and **Northern**. They all resemble each other in form and colour, though they differ somewhat in their habits. Richardson supposes there are still other species.

POUCHED RATS.

These animals, of which there are several kinds, have a strong resemblance to the mole. The common Pouched Rat is found in abundance in Florida, Georgia, and Missouri, and their burrows are so numerous, as to give the ground where they are made, the appearance of ploughed land, a small hillock of earth being raised over each burrow. By the aid of its long claws, this animal is enabled to make its way under ground with great rapidity. But little is known of its habits, as it is peculiarly vigilant, and seldom makes its appearance in the day time. It takes its name from the pouches which it has on the cheeks, which give it a very singular appearance.

Richardson mentions four other kinds of Rats with cheek pouches, viz. Columbia Sand-Rat, Lead Beater's Sand-Rat, Canada Pouched Rat, and mole-shaped Sand-Rat. These all burrow in the ground like the mole.

CAMAS RAT, OR GOPHER.

This animal is found on the Columbia and Missouri rivers. It lives beneath the surface of the earth, and eats roots. The head appears large and clumsy, owing to its cheek pouches. The root of the Camas plant is its favorite food, from which it derives its name. It is said by Schoolcraft, to employ its pouches in carrying dirt out of its hole, and Richardson adopts this account as true; but an intelligent individual, who has spent much time in the country which it frequents, assures us that he has often seen the Gopher at work, and that it brings up the dirt with its broad feet. The quantity that it will throw out in a short space of time, is truly astonishing.

THE SHREW MOUSE

Seems to form a shade in the order of small animals, and to fill up the vacuum between the rat and the mole. The Shrew Mouse is smaller still than the domestic Mouse, and resembles the mole in its snout, which is longer than its jaw bones; in its eyes, which, though rather larger than those of the mole, are, however, in like manner concealed, and much smaller than those of the domestic Mouse; in the number of its claws, of which it has five to each foot; in its tail, and its legs, particularly those behind, which are shorter than those of the domestic Mouse; and, lastly, in its ears, and in its teeth.

This diminutive creature has a strong smell, which is peculiar to itself, and so offensive to cats, that, though they will cheerfully chase and kill the Shrew Mouse, they yet will not eat its flesh like that of the domestic Mouse. It is evidently this noisome odour, this aversion of the cat to it, that gave rise to the notion, that the Shrew Mouse is a venomous animal, and that its bite is so dan-

gerous to cattle of all sorts, and particularly to horses. The truth, however, is, that it is neither venomous nor capable of biting; for it cannot open its mouth sufficiently wide to seize the double thickness of the skin, which is absolutely necessary, in order to bite. The distemper among horses, it is farther to be observed, which the vulgar attribute to the tooth of the Shrew Mouse, is a swelling which proceeds from an internal cause, and has no connection with any bite, or rather scratch, that this little animal may give.

In winter especially, the Shrew Mouse generally fixes its residence in some hayloft, stable, or barn, where it feeds on grain, insects, and putrified flesh. It is likewise found in woods and fields, where, living on corn, it sometimes conceals itself under moss or leaves, sometimes under the trunks of trees, sometimes in holes abandoned by moles, and sometimes in holes of a smaller size, which it forms for itself by digging with its claws and snout.

The Shrew Mouse produces, it is said, as many at a birth as the domestic Mouse, though less frequently. It has a squeak much more sharp and piercing than the latter. In point of nimbleness, however, it is far inferior; and as it both sees imperfectly, and runs slowly, there is little difficulty in taking it.

The usual colour of these creatures is brown, with a mixture of red; others of them are ash-coloured; and in all there is a greater or less degree of whiteness upon the belly. They are very common throughout Europe; and in America, there are several species of a small size. Among them are the SMALL SHREW and the SHORT-TAIL SHREW. The first is found on the Missouri, and the latter on the Rocky Mountains. Godman mentions a third species, and Richardson notices two others, AMERICAN MARSH SHREW, and FOSTERS SHREW MOUSE.

and when, to destroy them, the ship has been smoked between decks, six hampers a day have for some time been filled with their carcasses. The Isle of France was once abandoned on account of their immense swarms, and, even now, they are a severe scourge to it. In old houses, in the country especially, where great quantities of corn are kept, and where the neighbouring barns and haystacks favour their retreat, as well as their multiplication, they are often so numerous, that the inhabitants would be obliged to remove with their furniture, were they not to devour each other. This we have often, by experience, found to be the case when they have been in any degree straitened for provisions; and the method they take to lessen their numbers, is, for the stronger to fall upon the weaker. This done, they lay open their skulls, and first eat up the brains, afterwards the rest of their body. The next day, hostilities are renewed in the same manner; nor do they suspend their havock till the majority are destroyed. For this reason it is, that, after any place has for a long while been infested with Rats, they often seem to disappear of a sudden, and sometimes for a considerable time.

The female always prepares a bed for her young, and provides them immediately with food. On their first quitting the hole, she watches over, defends, and will even fight the cats, in order to save them. The weasel, though a smaller animal, is, however, a still more formidable enemy than the cat. The Rat cannot inflict any wounds but by snatches, and with his fore teeth, which, however, being rather calculated for gnawing than for biting, have but little strength; whereas the weasel bites fiercely with the force of its whole jaw at once, and, instead of letting go its hold, sucks the blood through the wound. In every conflict with an enemy so dangerous, it is no wonder, therefore, that the Rat should fall a victim. The black Rat has

nearly been exterminated in England by the brown Rat, which was introduced from Norway.*

There are many varieties in the black species. [illegible] Rat, like the white mouse, the white [illegible] animals which are [illegible] of that colour [illegible] The white species, with all its varieties, [illegible] to the temperate climates of the eastern continent. [illegible] have been diffused in much greater abundance [illegible] countries than cold ones. Originally they [illegible] America; and those which are to be found there in such numbers at this day, are the produce of Rats which accidentally obtained a footing there with the first European settlers. Of these the increase was so great, that the Rat was long considered as the pest of the colonies; where, indeed, it had hardly an enemy to oppose it. The European ships have likewise carried these animals to the East Indies, into all the islands of the Indian Archipelago, as well as into Africa, where they are found in great numbers. In the North, on the contrary, they have hardly multiplied beyond Sweden.

THE BROWN RAT

Is both stronger and more mischievous than the black Rat; it has a reddish skin, a long tail, the back bone arched like that of the squirrel, the body much thicker, and whiskers like those of a cat. It is about nine inches long, and has a tail of the same length as the body, covered with minute dusky scales, thickly interspersed with short hairs. It is considerably within half a century since that species

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There are many varieties in the Rat species. The white Rat, like the white mouse, the white rabbit, and all other animals which are entirely of that colour, has red eyes. The white species, with all its varieties, appears to belong to the temperate climates of the eastern continent, and have been diffused in much greater abundance over hot countries than cold ones. Originally they had no Rats in America; and those which are to be found there in such numbers at this day, are the produce of Rats which accidentally obtained a footing there with the first European settlers. Of these the increase was so great, that the Rat was long considered as the pest of the colonies; where, indeed, it had hardly an enemy to oppose it. The European ships have likewise carried these animals to the East Indies, into all the islands of the Indian Archipelago, as well as into Africa, where they are found in great numbers. In the North, on the contrary, they have hardly multiplied beyond Sweden.

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Is both stronger and more mischievous than the black Rat; it has a reddish skin, a long tail, the back bone arched like that of the squirrel, the body much thicker, and whiskers like those of a cat. It is about nine inches long, and has a tail of the same length as the body, covered with minute dusky scales, thickly interspersed with short hairs. It is considerably within half a century since that species

has been spread in the neighbourhood of Paris.[*][†] They multiply indeed prodigiously, since it is well known that they generally produce twelve or fifteen, often sixteen, seventeen, eighteen, and even nineteen young ones at a time. The males are larger, stronger, and more mischievous than the females. When any one pursues, and endeavours to take them, they will turn again, and bite the hand or stick which touches them. Their bite is not only sharp but dangerous, and is immediately followed by a considerable swelling; and the wound, though small, is yet long in being closed. They bring forth three times in a year, the dams previously preparing a bed for their young; and thus two individuals of this species produce at least three dozen in the space of twelve months.

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The Brown Rat in its nature, and some of its habitudes, bears a resemblance to the water Rat. Though there is no place in which they will not fix their residence, they yet seem to delight in living near the water. When they find themselves pursued, and have the same opportunity of sheltering themselves in the water, or in a thorny thicket, they prefer the former, plunge into it without dread, and swim with amazing facility. This particularly happens when they cannot get back to their burrows; for they always dig holes for themselves in the earth, or else occupy those of the rabbit. They may also be taken, like that animal, by means of the ferret, which follows them underground in the same manner as it does the rabbit, and seemingly with even more ardour.

These animals live principally upon fruit and corn, but are, notwithstanding, exceedingly carnivorous. They de-

vour young rabbits, partridges, and other birds; and when they enter a hen-roost, they destroy, like the pole-cat, more than they can eat. They do not become torpid in the winter, like the dormouse, but take advantage of every fine day to come out of their subterranean mansions. Those which live in barns drive away the mice; and it has even been remarked in Europe, that the black Rats as they are called, have been far less common since th Brown Rats became so numerous.

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[*] It has not been known in England above sixty years, though now almost, if not quite, the only species of Rat. ED.

[†] Harlan says it was not known in America, till 1775.

THE WATER RAT

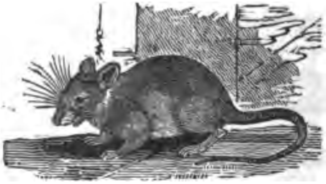
Is a little animal, about the size of the black Rat, but in its nature and habits rather resembling the otter than the Rat. Like the otter, it frequents the fresh waters, and is generally found on the borders of rivers, rivulets, and ponds: like that creature, too, it seldom feeds but upon fish, or the spawn of fish, though sometimes it eats frogs, water-insects, and even roots and herbs. This animal is not web-footed; but, though every toe of its feet is separated, it swims with facility, keeps itself a long time above water, and carries off its prey, in order to eat it when it has reached the land.

The head of the Water Rat is shorter, the nose broader, the hair more erect, and the tail much longer than that of the land Rat. On the back it is of a fine raven black; the under part is white, with a black line along the middle. The body is about three inches long. The fur has an astonishing power of resisting water. Like the otter, it flies from large rivers, or rather from those which are too much frequented, and is never found either in houses or in barns.

It is probable, that these animals bring forth often in a year; but of this we have no certain information. Their flesh is not absolutely bad; and, in Catholic countries, the

peasants eat it during the Lent, as they do that of the otter. The species is to be found throughout Europe, the very extremities of the north excepted. In Holland it is devoted to destruction, as one of the most dangerous enemies of the country, in consequence of its burrowing in the dykes.

THE MOUSE



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These creatures are fond of dry and elevated grounds. In woods, and in the fields adjoining to them, they are to be found in great numbers. They conceal themselves in holes, which they either find already made, or which they make for themselves, under bushes, or the trunks of hollow trees. In these they amass so prodigious a quantity of acorns, nuts, &c. that in one single hole there has been found a bushel at a time; and this provision, instead of being proportioned to the wants of the animal, is only so to the capacity of the place allotted for its reception. These holes are generally more than a foot under ground, and often divided into two cells, of which the one serves for a habitation for itself and its young ones, and the other for a granary. The only method of preventing their ravages, which has appeared effectual, is that of setting traps at every tenth pace through the whole extent of each piece of new sown land. There wants no other bait than a roasted nut laid under a flat stone, which is to be supported by a small bit of wood. This they will eagerly attempt to seize; and, being fixed to the wood, no sooner do they touch it, than the stone falls upon them, and stifles or crushes them to death.

THE SHORT-TAILED FIELD MOUSE

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the corn begins to ripen, they flock together from all sides, and frequently do great damage, by cutting the stalk, in order to come at the ear. In autumn and winter, the greater part of them withdraw into the woods, where they find beach-mast, nuts, and acorns. Some years they appear in such great numbers, that they would destroy every thing, were they to subsist for any length of time. For want of other food, however, they often destroy and eat one another, and are themselves the usual prey of the fox, the wild cat, the martin, the weasel, and of the long-tailed field Mouse.

There is another species of field Mouse, called the Harvest Mouse, which is the smallest of British quadrupeds; two of them not weighing more than one halfpenny. This kind makes a beautiful nest, as round as a cricket ball, and about the same size.

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The Cotton Rat, or Hairy Campagnol, is found in East Florida. It burrows in gardens and in deserted plantations on the banks of rivers. It derives its name from the circumstance of its making its nest of cotton, which it collects in great quantities. The nest is placed generally in a hollow log.

The **Jumping Mouse**, when not in motion, might be mistaken for the field Mouse. It is found from Canada to Pennsylvania, and is of the size of the common Mouse. It is of a reddish brown colour, and has very short fore legs. Its hind legs are of great length, and enable it to leap over five or six feet of ground at every spring. When pursued, its movements are like those of a bird, so high does it leap, and so light and quick is its ascent and descent. It runs also with speed, and it is in vain to attempt to catch it.

These animals remain torpid during the winter, wrapping themselves in a coat of clay, so curiously as to conceal itself entirely. In the spring they sally forth into the grain and grass fields, and do considerable mischief to the farmers by their depredations.

The **Labrador Jumping Mouse** closely resembles the preceding species in its habits, and is a very common animal in the fur countries, as far north as Slave Lake. It is of a brown colour above, and white beneath.

The **Wood-Rat** is found in Florida and Missouri. It burrows under stones, and among the ruins of old buildings, and builds its nest of large quantities of rubbish. It is peculiarly inoffensive in its habits, and is of a timid and gentle disposition. This animal is said to construct its habitations with great labor, raising pyramids three or four feet high, of dry branches, so interwoven that it is very difficult to destroy them.

Of the **Meadow Mouse** there are five kinds, viz. **Bank Mouse**, **Yellow-Cheeked**, **Wilson's**, **Sharp-Nosed**, and **Northern**. They all resemble each other in form and colour, though they differ somewhat in their habits. Richardson supposes there are still other species.

POUCHED RATS.

These animals, of which there are several kinds, have a strong resemblance to the mole. The common Pouched Rat is found in abundance in Florida, Georgia, and Missouri, and their burrows are so numerous, as to give the ground where they are made, the appearance of ploughed land, a small hillock of earth being raised over each burrow. By the aid of its long claws, this animal is enabled to make its way under ground with great rapidity. But little is known of its habits, as it is peculiarly vigilant, and seldom makes its appearance in the day time. It takes its name from the pouches which it has on the cheeks, which give it a very singular appearance.

Richardson mentions four other kinds of Rats with cheek pouches, viz. Columbia Sand-Rat, Lead Beater's Sand-Rat, Canada Pouched Rat, and mole-shaped Sand-Rat. These all burrow in the ground like the mole.

CAMAS RAT, OR GOPHER.

This animal is found on the Columbia and Missouri rivers. It lives beneath the surface of the earth, and eats roots. The head appears large and clumsy, owing to its cheek pouches. The root of the Camas plant is its favorite food, from which it derives its name. It is said by Schoolcraft, to employ its pouches in carrying dirt out of its hole, and Richardson adopts this account as true; but an intelligent individual, who has spent much time in the country which it frequents, assures us that he has often seen the Gopher at work, and that it brings up the dirt with its broad feet. The quantity that it will throw out in a short space of time, is truly astonishing.

THE SHREW MOUSE

Seems to form a shade in the order of small animals, and to fill up the vacuum between the rat and the mole. The Shrew Mouse is smaller still than the domestic Mouse, and resembles the mole in its snout, which is longer than its jaw bones; in its eyes, which, though rather larger than those of the mole, are, however, in like manner concealed, and much smaller than those of the domestic Mouse; in the number of its claws, of which it has five to each foot; in its tail, and its legs, particularly those behind, which are shorter than those of the domestic Mouse; and, lastly, in its ears, and in its teeth.

This diminutive creature has a strong smell, which is peculiar to itself, and so offensive to cats, that, though they will cheerfully chase and kill the Shrew Mouse, they yet will not eat its flesh like that of the domestic Mouse. It is evidently this noisome odour, this aversion of the cat to it, that gave rise to the notion, that the Shrew Mouse is a venomous animal, and that its bite is so dan-

gerous to cattle of all sorts, and particularly to horses. The truth, however, is, that it is neither venomous nor capable of biting; for it cannot open its mouth sufficiently wide to seize the double thickness of the skin, which is absolutely necessary, in order to bite. The distemper among horses, it is farther to be observed, which the vulgar attribute to the tooth of the Shrew Mouse, is a swelling which proceeds from an internal cause, and has no connection with any bite, or rather scratch, that this little animal may give.

In winter especially, the Shrew Mouse generally fixes its residence in some hayloft, stable, or barn, where it feeds on grain, insects, and putrified flesh. It is likewise found in woods and fields, where, living on corn, it sometimes conceals itself under moss or leaves, sometimes under the trunks of trees, sometimes in holes abandoned by moles, and sometimes in holes of a smaller size, which it forms for itself by digging with its claws and snout.

The Shrew Mouse produces, it is said, as many at a birth as the domestic Mouse, though less frequently. It has a squeak much more sharp and piercing than the latter. In point of nimbleness, however, it is far inferior; and as t both sees imperfectly, and runs slowly, there is little difficulty in taking it.

The usual colour of these creatures is brown, with a mixture of red; others of them are ash-coloured; and in all there is a greater or less degree of whiteness upon the belly. They are very common throughout Europe; and n America, there are several species of a small size. Among them are the SMALL SHREW and the SHORT-TAIL SHREW. The first is found on the Missouri, and the later on the Rocky Mountains. Godman mentions a third pecies, and Richardson notices two others, AMERICAN MARSH SHREW, and FOSTERS SHREW MOUSE.

THE WATER SHREW MOUSE,

Though a native of Europe was yet unknown to any of the naturalists, till M. Daubenton first discovered it. Every thing necessary to be added here, with respect to the Water Shrew Mouse, is, that it is taken at the sources of fountains, in the morning and evening, as the sun rises and sets; that in the day time it remains concealed in the clefts of rocks, or in holes under ground, near the edges of rivulets; that it brings forth in spring, and commonly produces nine young ones at a time.

THE CHINCHILLA.

This interesting animal, which produces the fur which passes under its name, is a species of Field Mouse, and is common in the high plains of Chili and Peru. It is about nine inches in length, and has a tail about half the length of its body. It sits upon its haunches, and takes its food in its fore paws like a squirrel. It feeds chiefly upon bulbous roots.

THE BAT.

An animal, which, like the Bat, is half quadruped and half bird, and which, in fact, is neither the one nor the other, is a kind of monster. In the Bat, the fore feet are, properly speaking, neither wings nor feet, though the animal uses them for the purpose of flying, and occasionally of moving along upon the ground. They are, in fact, two shapeless extremities, of which the bones are of a monstrous length, and connected by a membrane, not covered with feathers, or even with hair, like the rest of the body: they are a kind of winged paws, or hands, ten times larger than the feet, and, in all, four times longer than the whole length of the body of the animal: they are, in a word, parts which have rather the appearance of a capricious and accidental, than a regular and determined production.

To these incongruities, these disproportions of the body and members, may be added the still more striking deformities of the head. In some species, the nose is hardly visible, the eyes are sunk near the tip of the ear, and are confounded with the cheeks; in others, the ears are as long as the body, or else the face is twisted into the form of a horse-shoe, and the nose covered with a kind of crust. Averse, likewise, to the society of all other creatures, they shun the light, inhabit none but dark and gloomy places, to which, after their nocturnal excursions, they are sure to return by break of day, and in which they remain, fixed, as it were, to the walls, till night again approaches.

Their motion in the air is with less propriety to be term-

ed a flight, than a kind of uncertain flutter, which they seem to execute by struggles, and in an awkward manner. They raise themselves from the ground with difficulty, never soar to a great height, and are but imperfectly qualified to accelerate, or even to direct, their flight. This, far from being either rapid, or very direct, is performed by hasty vibrations in an oblique and winding direction; and in passing along they do not fail to seize all the gnats, moths, and other nocturnal insects that come in their way. These they swallow entire; and in their excrements we meet with the remains of wings and the other dry parts, which they have not been able to digest. Like quadrupeds, the Bat brings forth its young alive, and like them it has teeth and nipples.

From the observations of Spallanzani, it appears that the LONG-EARED, the HORSESHOE, and the NOCTULE BATS, possess an additional sense, by which, when deprived of seeing, they are enabled to avoid any obstacles that may be in the way of their flight.

It is affirmed that these animals do not produce more than two at a birth, and that these they suckle, and even carry along with them as they fly. They unite in numbers to defend each other from the cold; they pass the winter without awaking, without stirring, and without eating, from the end of autumn till spring. Though they can more easily support hunger than cold, and can even subsist a number of days without food, they yet belong to the number of carnivorous animals; for, when opportunity serves, they will devour bacon, and meat of all kinds, whether raw or roasted, whether fresh or corrupted.

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OF these, Godman notices five kinds, viz. the CAROLINA BAT, HOARY BAT, CUENATED BAT, SUBULATE BAT, and NEW YORK BAT.

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The Fat Squirrel is nearly of the size of the common European Squirrel, and, like it, its tail is covered with long hair. It is of a pale ash colour on the upper parts of the body, and whitish on the under. It is without propriety that the term *sleep* has been applied to the state of these animals during the winter. They are not in a state of natural sleep at this period; they are in a torpor, which is produced by the coldness of the blood, and by which they lose the use of their members and senses. Their internal heat is indeed so small, that it hardly exceeds that of the temperature of the air. When the heat of the air is at ten degrees above the freezing point of the thermometer, the heat of these animals is also at ten degrees. Now it is well known, that the internal heat of man, and of the generality of animals, exceeds at all times thirty degrees; and therefore there is little reason to wonder why these animals, so inferior to all others in point of heat, should become torpid as soon as their little quantity of internal heat ceases to be assisted by the external heat of the air; a circumstance which naturally happens when the thermometer is not more than ten or eleven degrees above congelation. This is the real cause of the torpor of these animals; a cause of which naturalists have not been apprized, and which, nevertheless, extends to all animals that sleep during the winter.

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duces it continues, and ceases when the cold ceases. A few degrees of heat above the tenth or eleventh degree are sufficient to reanimate these creatures; and if they are kept in a very warm place during the winter, they do not become torpid at all.

Though in this torpid state, they are without the smallest motion, though their eyes are shut, and they seem to be deprived of all use of the senses, they yet feel pain when it is very acute. This they testify by a movement of contraction, as also by a little hollow cry, which they even repeat several times. I am inclined to believe, that it is not from too great waste of substance that they sometimes perish in long winters, since in autumn they are excessively fat, and on their reviving in spring, they are found to have still remained so; this abundance of fat being an internal nourishment which is sufficient to support them, and to supply what they lose by perspiration.

The flesh of the Fat Squirrel is not unlike that of the guinea-pig. They were considered as a dainty by the Romans, who fattened great numbers of them in receptacles called *gliraria.* Like the common Squirrel, this animal lives in forests, climbs to the tops of trees, and leaps from branch to branch. This it does less nimbly indeed than the Squirrel, whose legs are longer, whose belly is by no means so big, and which is remarkable for being meagre. Nuts, however, and other wild fruits, form its usual nourishment. It likewise eats little birds, which it takes in the nests. It does not, like the Squirrel, nestle in the upper parts of trees, but makes a bed of moss in the trunks of those which are hollow. It also shelters itself in the clefts of rocks, and always manifests a preference for dry places. It avoids moisture, it drinks little, rarely descends to the ground, and, unlike the Squirrel, which is easily tamed, remains always wild. The species is very

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These animals nestle in the holes of walls, climb up trees, choose the best fruits, and gnaw them as they begin to ripen. To peaches, in particular, they are exceedingly destructive. They climb up pear, apricot, and other trees; and in a scarcity of other fruit, they eat almonds, nuts, and even leguminous plants. These they carry in great quantities to their holes, where they make a bed of herbs, moss, and leaves. The cold stupifies, the heat revives them; and sometimes there are eight or ten found in one place, all in a state of torpor, all huddled together, and rolled up in a ball, in the midst of their hoard of provisions. Their flesh is not eatable, and has even the disagreeable smell of the house rat.

This animal is to be found in all the temperate climates of Europe, and even in Poland, and in Prussia; but it does not appear that there are any in Sweden, or in any of the more northern countries.

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ITS eyes are sparkling, full, and black; its tail is tufted, and its hair of a tawny red. The throat is white. It never lives in houses, is seldom to be found in gardens, but

chiefly frequents the woods, where it finds a shelter in the hollow of some old tree.

The species is by no means numerous, yet they seem to be tolerably common in Italy; and to be not unknown even in the northern climates; but it does not appear to be an English animal; for Ray, who had seen it in Italy, observes, that the small Dormouse which is found in England is not red upon the back, like the Italian, and that it probably belongs to another species.

The Dormouse becomes torpid by the cold, and rolls itself up in a ball; it revives in mild weather, and hoards up nuts and other dry fruits for future sustenance. It forms its nest in trees, like the squirrel, though generally in a lower situation, among the branches of a nut tree, in a bush, &c. The nest is composed of interwoven moss, leaves, and grass; is about six inches in diameter; has no aperture but at the top, and contains three or four young ones.

THE GUINEA-PIG, OR RESTLESS CAVY,

Though originally a native of the warm climates of Brazil and Guinea, lives, however, and breeds in temperate and even cold countries, provided it is properly taken care of. Its skin is of little or no value; and the flesh, though people may, and actually do eat it, is very indifferent food; a circumstance which might, in some measure, be removed, were they to be reared in warrens, where they might have air, space to range in, and a proper choice of

herbs. Those which are kept in houses have nearly the same taste as the house rabbit; and of those which have passed the summer in a garden, the taste is less disagreeable, but is still insipid.

The Guinea-pig is much less than the rabbit; its upper lip is only half divided; it has two cutting teeth in each jaw; large and broad ears; its hair is of different colours, white, varied with orange and black, in irregular patches. It has no tail, and is very restless, from which latter circumstance it derives the epithet affixed to one of its names.

The growth of these animals is not entirely completed till the expiration of eight or nine months; though indeed it is in apparent bulk and fat that they chiefly increase till then, the developement of the solid parts being finished before the age of five or six months. The female never goes with young above three weeks; and she has been known to bring forth when only two months old. The first litter is not so numerous as the subsequent litters. It does not amount to more than four or five; the second amounts to five or six, and the rest to seven or eight, and even to ten or eleven. She does not suckle her young onger than twelve or fifteen days. Thus these animals produce at least every two months; and as those which are newly born produce in the same manner, their multiplication is astonishing. In one year a thousand might be obtained from a single couple, did they not frequently destroy each other, and perish from the cold and wet.

The Guinea-pig feeds on all sorts of herbs, and especially on parsley, which it prefers even to bran, flour, or bread. Of apples and other fruits it is also exceedingy fond. Like the rabbit, it eats precipitately, little at a time, but very often. It whines somewhat like a young pig.

So cleanly are Guinea-pigs, that much of their time is spent in licking and smoothing the fur of each other, and of the little ones; and should the latter chance to be dirtied, the mother will never again suffer them to come near her. If kept in a room, it seldom crosses the floor, but creeps round by the wall.

These animals are so delicate, that it is with difficulty they undergo the rigours of winter. When they feel the cold, they assemble together, press close to one another, and in this situation are frequently found dead.

THE MOLE,

Without being blind, has such small eyes, and these so concealed, that it was formerly supposed to be able to make little use of the sense of seeing; but it is now known that its eyes possess all the qualities necessary to distinct vision. It enjoys also the senses of hearing and feeling in an eminent degree. Its skin is soft as silk: and its little paws, which are furnished with five claws, are very different from those of other animals, and almost like the hands of a human being. Proportioned to the size of its body, its strength is great; it possesses the mild habitudes of repose and of solitude; the art of securing itself, of forming, instantaneously, as it were, an asylum to itself; or extending it, and of obtaining, without the necessity of relinquishing it, an abundant subsistence.

The Mole shuts up the entry to its retreat, which it seldom deserts, unless forced to it by heavy rains in summer. It is fond of cultivated grounds, and is never to be found in those which are either muddy, hard, compact, or stony. It requires a soft soil, well supplied with esculent roots, and with insects and worms, of which, indeed, its principal nourishment consists. In the skinning of worms, which they always do before they eat them, they display much expertness; stripping off the skin from end to end, and squeezing out the contents of the body.

As these animals very seldom come above ground, they have but few enemies; and very readily evade the pursuit of animals swifter and stronger than themselves. The chief calamity which befals them is an inundation; and when this happens, they are seen in numbers attempting to save themselves by swimming, and using every effort to reach the higher grounds. The greatest part, however, perish, as well as the young, which remain behind in their holes. Were it not for such accidents, from their great fecundity, they would become extremely troublesome. They generally have four or five at a time; and it is easy to distinguish among other Mole hills, that in which the female has brought forth her young. These are made with much greater art than the rest; and are usually larger and more elevated. It is probable they produce oftener than once a year. Thus far indeed is certain, that new born Moles are found from the month of April to the month of August; a circumstance which, however, may be owing to their having been engendered and brought forth sooner or later in the year.

The hole in which they produce their young is formed with singular skill, and deserves a particular description. The female begins by erecting the earth into a tolerably spacious apartment, which is supported within by partitions

at proper distance, that prevent the roof from falling. All round this she works, and beats the earth very firm, so as to make it capable of keeping out the rain, let it be ever so violent. As the hillock, in which the apartment is thus formed, is raised above ground, the apartment itself is consequently above the level of the plain, and therefore less subject to accidental slight inundations. The place being thus fitted, she procures grass and dry leaves, as a bed for her young. There they lie secure from wet, and she continues to make their retreat equally free from danger; for all round this hill of her own raising, are holes running into the earth, which go off from the middle apartment, like rays from a centre, and extend about fifteen feet in every direction. These resemble so many walks or chases, into which the animal makes her subterraneous excursions, and supplies her young with such roots or insects as she can provide; but they contribute still more to the general safety; for as the Mole is very quick of hearing, the instant she perceives her little habitation attacked, she takes to her burrow, and unless the earth be dug away by several men at once, she and her young always make good a retreat.

Moles live in pairs, between which a warm attachment subsists. They are, however, said to be ferocious, and occasionally to tear and eat each other.

Some authors have said, but without foundation, that the Mole and the badger sleep the whole winter.* That this is not true of the badger, has been already observed; and as a proof that this animal quits its hole in winter as well as in summer, we have only to view the traces it leaves upon the snow. As for the Mole, so far is it from sleeping during the winter, that it continues its subterranean

operations then as well as in summer; and the peasants of France even proverbially remark, that "when Moles are at work, a thaw is at hand." They are indeed fond of warm places; and the gardeners often catch them round their beds in the months of December, January, and February. In pasture lands, and in nurseries of forest trees, they do considerable mischief. In 1740, M. de Buffon planted sixteen acres with acorns, the greatest part of which were speedily carried away by the Moles. Not less than a bushel of acorns was found in some of their burrows. The common Mole of Europe is supposed not to inhabit America.

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* In an account of the American Badger we have stated that it lies in a torpid state during the winter.

THE SHREW MOLE is found in abundance in North America, from Canada to Virginia. It lives principally under ground, in which it burrows with great quickness, by means of its strong and broad hands, armed with sharp claws. These burrows are sometimes very deep, and hills of loose earth are generally found over them. Sometimes one of these creatures shows his head from the centre of one of the hills at mid-day, for the purpose of enjoying the sunshine. They form galleries under ground, by which they can travel in any direction. It is said that they come to the top of the ground daily at twelve o'clock.

The favourite food of the Shrew Mole is the earthworm, though they destroy great numbers of grubs and insects. They are exceedingly attached to a long frequented burrow, and when it is injured, will repair it in a short time; and continue to do so, as often as it is destroyed, with the utmost patience.

This animal is covered with a soft glossy fur; its head is destitute of external ears, though its sense of hearing is very acute. The eyes are so small as scarcely to be perceived. It has great strength and speed, even on the sur-

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The length of which varies from six to ten inches, has the power of defending itself from an enemy without combating him, and of annoying without attacking him. Possessed of little strength, and of no agility by which it might escape its foes, it has received from nature a prickly armour, with a facility of rolling itself up in a ball, and of presenting from every part of its body a poignant weapon of defence. Even from its fear this animal obtains another engine of security; the smell of its urine,

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duces it continues, and ceases when the cold ceases. A few degrees of heat above the tenth or eleventh degree are sufficient to reanimate these creatures; and if they are kept in a very warm place during the winter, they do not become torpid at all.

Though in this torpid state, they are without the smallest motion, though their eyes are shut, and they seem to be deprived of all use of the senses, they yet feel pain when it is very acute. This they testify by a movement of contraction, as also by a little hollow cry, which they even repeat several times. I am inclined to believe, that it is not from too great waste of substance that they sometimes perish in long winters, since in autumn they are excessively fat, and on their reviving in spring, they are found to have still remained so; this abundance of fat being an internal nourishment which is sufficient to support them, and to supply what they lose by perspiration.

The flesh of the Fat Squirrel is not unlike that of the guinea-pig. They were considered as a dainty by the Romans, who fattened great numbers of them in receptacles called *gliraria.* Like the common Squirrel, this animal lives in forests, climbs to the tops of trees, and leaps from branch to branch. This it does less nimbly indeed than the Squirrel, whose legs are longer, whose belly is by no means so big, and which is remarkable for being meagre. Nuts, however, and other wild fruits, form its usual nourishment. It likewise eats little birds, which it takes in the nests. It does not, like the Squirrel, nestle in the upper parts of trees, but makes a bed of moss in the trunks of those which are hollow. It also shelters itself in the clefts of rocks, and always manifests a preference for dry places. It avoids moisture, it drinks little, rarely descends to the ground, and, unlike the Squirrel, which is easily tamed, remains always wild. The species is very

generally diffused in Europe, but there are few or none of them in England.

THE GARDEN SQUIRREL, OR GREATER DORMOUSE.

THE fat Squirrel frequents the forests, and seems to shun the habitations of man; the Garden Squirrel, on the contrary, inhabits gardens, and is sometimes to be found in houses. The species of the latter is also more numerous, and more generally diffused. It is of a tawny colour on the upper part of the body, and whitish ash, tinged with yellow, on the under. Round each eye it has a black circle, and a black spot behind each ear.

These animals nestle in the holes of walls, climb up trees, choose the best fruits, and gnaw them as they begin to ripen. To peaches, in particular, they are exceedingly destructive. They climb up pear, apricot, and other trees; and in a scarcity of other fruit, they eat almonds, nuts, and even leguminous plants. These they carry in great quantities to their holes, where they make a bed of herbs, moss, and leaves. The cold stupifies, the heat revives them; and sometimes there are eight or ten found in one place, all in a state of torpor, all huddled together, and rolled up in a ball, in the midst of their hoard of provisions. Their flesh is not eatable, and has even the disagreeable smell of the house rat.

This animal is to be found in all the temperate climates of Europe, and even in Poland, and in Prussia; but it does not appear that there are any in Sweden, or in any of the more northern countries.

THE COMMON DORMOUSE.

ITS eyes are sparkling, full, and black; its tail is tufted, and its hair of a tawny red. The throat is white. It never lives in houses, is seldom to be found in gardens, but

chiefly frequents the woods, where it finds a shelter in the hollow of some old tree.

The species is by no means numerous, yet they seem to be tolerably common in Italy; and to be not unknown even in the northern climates; but it does not appear to be an English animal; for Ray, who had seen it in Italy, observes, that the small Dormouse which is found in England is not red upon the back, like the Italian, and that it probably belongs to another species.

The Dormouse becomes torpid by the cold, and rolls itself up in a ball; it revives in mild weather, and hoards up nuts and other dry fruits for future sustenance. It forms its nest in trees, like the squirrel, though generally in a lower situation, among the branches of a nut tree, in a bush, &c. The nest is composed of interwoven moss, leaves, and grass; is about six inches in diameter; has no aperture but at the top, and contains three or four young ones.

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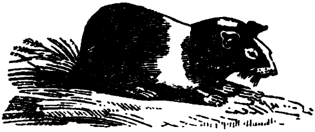

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"In the month of June, 1782," says a corespondent in the Gentleman's Magazine, " a full grown Hedgehog was put into a small yard, in which was a border of shrubs and annuals. In the course of a few days he formed, beneath a small holly tree, a hole in the earth sufficiently large to receive his body. After a while a small shed was built for him in the corner of the yard, and filled with straw; but the animal would not quit its former situation until it was covered with a stone. He then took possession of the shed, and every morning carried leaves from a distant part of the border, to stop its mouth. His principal food was raw meat and mice. Of the latter he would eat six at a time, but never more; and although these were thrown to him dead, he bit them all in the neck before he began to eat any. He would also eat snails with their shells; but would leave any thing for milk, which he lapped exceedingly slow. To this, even if set six or eight yards distant from his shed, he would almost always come out half an hour before his usual time. If the person who usually fed him neglected to do so, he would follow him along the yard; and if the door was open, he would go into the house. If meat was put near the mouth of his shed in the daytime, he would sometimes pull it in and eat it. As the weather became colder, he carried more leaves into his shed; and sometimes he would not come out for two or three days successively. About the end of November he died; from want of food, as was supposed, but most probably from the severity of the weather."

THE MARMOT,

When taken young, is more capable of being tamed than any other wild animal, and nearly as much so as the domestic ones. It will easily learn to perform feats with a

stick, to dance, and in every thing to obey the voice of its master. It has a great antipathy to the dog; and when it becomes familiar in a house, and is sure of being supported by its master, it will, in his presence, attack the largest dogs, and boldly fasten upon them with its teeth. Though this creature is not quite so large as a hare, it is yet of a more squat make, and has great strength joined to great agility. It has four teeth in the front of the jaw, which are long and strong enough to inflict a terrible wound; and yet, unless provoked to it, it neither attacks dogs, nor does mischief to any creature whatever. If care be not taken, however, it will gnaw the furniture of a house, and will even make holes through wooden partitions.

As the Marmot has very short thighs, and the toes of its paws are formed like those of the bear, so it often sits erect, and walks with ease, like that animal, upon its hind feet. With its fore paws it carries its food to its mouth, and eats in an upright posture like the squirrel. It runs much swifter up hill than down; it climbs trees, and runs up the clefts of rocks, or the contiguous walls of houses, with much facility; so much so, indeed, that it is ludicrously observed of the Savoyards, who are the general chimney-sweepers of Paris, that they have learned their trade from the Marmot.

These animals eat indiscriminately of whatever is given them, whether it be flesh, bread, fruits, herbs, roots, pulse, or insects. Of milk and butter, however, they are particularly fond; and, though less inclined to petty thefts than the cat, they are yet never better pleased than when they obtain access to the dairy.

There seems to be a combination of the bear and the rat in the form of the Marmot. Its nos[illegible] its lips, and the form of its head, are like those of the [illegible]; it has the hair

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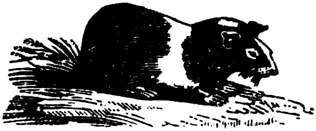

Though originally a native of the warm climates of Brazil and Guinea, lives, however, and breeds in temperate and even cold countries, provided it is properly taken care of. Its skin is of little or no value; and the flesh, though people may, and actually do eat it, is very indifferent food; a circumstance which might, in some measure, be removed, were they to be reared in warrens, where they might have air, space to range in, and a proper choice of

herbs. Those which are kept in houses have nearly the same taste as the house rabbit; and of those which have passed the summer in a garden, the taste is less disagreeable, but is still insipid.

The Guinea-pig is much less than the rabbit; its upper lip is only half divided; it has two cutting teeth in each jaw; large and broad ears; its hair is of different colours, white, varied with orange and black, in irregular patches. It has no tail, and is very restless, from which latter circumstance it derives the epithet affixed to one of its names.

The growth of these animals is not entirely completed till the expiration of eight or nine months; though indeed it is in apparent bulk and fat that they chiefly increase till then, the developement of the solid parts being finished before the age of five or six months. The female never goes with young above three weeks; and she has been known to bring forth when only two months old. The first litter is not so numerous as the subsequent litters. It does not amount to more than four or five; the second amounts to five or six, and the rest to seven or eight, and even to ten or eleven. She does not suckle her young longer than twelve or fifteen days. Thus these animals produce at least every two months; and as those which are newly born produce in the same manner, their multiplication is astonishing. In one year a thousand might be obtained from a single couple, did they not frequently destroy each other, and perish from the cold and wet.

The Guinea-pig feeds on all sorts of herbs, and especially on parsley, which it prefers even to bran, flour, or bread. Of apples and other fruits it is also exceedingly fond. Like the rabbit, it eats precipitately, little at a time, but very often. It whines somewhat like a young pig.

So cleanly are Guinea-pigs, that much of their time is spent in licking and smoothing the fur of each other, and of the little ones; and should the latter chance to be dirtied, the mother will never again suffer them to come near her. If kept in a room, it seldom crosses the floor, but creeps round by the wall.

These animals are so delicate, that it is with difficulty they undergo the rigours of winter. When they feel the cold, they assemble together, press close to one another, and in this situation are frequently found dead.

THE MOLE,

Without being blind, has such small eyes, and these so concealed, that it was formerly supposed to be able to make little use of the sense of seeing; but it is now known that its eyes possess all the qualities necessary to distinct vision. It enjoys also the senses of hearing and feeling in an eminent degree. Its skin is soft as silk; and its little paws, which are furnished with five claws, are very different from those of other animals, and almost like the hands of a human being. Proportioned to the size of its body, its strength is great; it possesses the mild habitudes of repose and of solitude; the art of securing itself, of forming, instantaneously, as it were, an asylum to itself; or extending it, and of obtaining, without the necessity of relinquishing it, an abundant subsistence.

The Mole shuts up the entry to its retreat, which it seldom deserts, unless forced to it by heavy rains in summer. It is fond of cultivated grounds, and is never to be found in those which are either muddy, hard, compact, or stony. It requires a soft soil, well supplied with esculent roots, and with insects and worms, of which, indeed, its principal nourishment consists. In the skinning of worms, which they always do before they eat them, they display much expertness; stripping off the skin from end to end, and squeezing out the contents of the body.

As these animals very seldom come above ground, they have but few enemies; and very readily evade the pursuit of animals swifter and stronger than themselves. The chief calamity which befals them is an inundation; and when this happens, they are seen in numbers attempting to save themselves by swimming, and using every effort to reach the higher grounds. The greatest part, however, perish, as well as the young, which remain behind in their holes. Were it not for such accidents, from their great fecundity, they would become extremely troublesome. They generally have four or five at a time; and it is easy to distinguish among other Mole hills, that in which the female has brought forth her young. These are made with much greater art than the rest; and are usually larger and more elevated. It is probable they produce oftener than once a year. Thus far indeed is certain, that new born Moles are found from the month of April to the month of August; a circumstance which, however, may be owing to their having been engendered and brought forth sooner or later in the year.

The hole in which they produce their young is formed with singular skill, and deserves a particular description. The female begins by erecting the earth into a tolerably pacious apartment, which is supported within by partitions

at proper distance, that prevent the roof from falling. All round this she works, and beats the earth very firm, so as to make it capable of keeping out the rain, let it be ever so violent. As the hillock, in which the apartment is thus formed, is raised above ground, the apartment itself is consequently above the level of the plain, and therefore less subject to accidental slight inundations. The place being thus fitted, she procures grass and dry leaves, as a bed for her young. There they lie secure from wet, and she continues to make their retreat equally free from danger; for all round this hill of her own raising, are holes running into the earth, which go off from the middle apartment, like rays from a centre, and extend about fifteen feet in every direction. These resemble so many walks or chases, into which the animal makes her subterraneous excursions, and supplies her young with such roots or insects as she can provide; but they contribute still more to the general safety; for as the Mole is very quick of hearing, the instant she perceives her little habitation attacked, she takes to her burrow, and unless the earth be dug away by several men at once, she and her young always make good a retreat.

Moles live in pairs, between which a warm attachment subsists. They are, however, said to be ferocious, and occasionally to tear and eat each other.

Some authors have said, but without foundation, that the Mole and the badger sleep the whole winter.* That this is not true of the badger, has been already observed; and as a proof that this animal quits its hole in winter as well as in summer, we have only to view the traces it leaves upon the snow. As for the Mole, so far is it from sleeping during the winter, that it continues its subterranean

operations then as well as in summer; and the peasants of France even proverbially remark, that "when Moles are at work, a thaw is at hand." They are indeed fond of warm places; and the gardeners often catch them round their beds in the months of December, January, and February. In pasture lands, and in nurseries of forest trees, they do considerable mischief. In 1740, M. de Buffon planted sixteen acres with acorns, the greatest part of which were speedily carried away by the Moles. Not less than a bushel of acorns was found in some of their burrows. The common Mole of Europe is supposed not to inhabit America.

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* In an account of the American Badger we have stated that it lies in a torpid state during the winter.

The Shrew Mole is found in abundance in North America, from Canada to Virginia. It lives principally under ground, in which it burrows with great quickness, by means of its strong and broad hands, armed with sharp claws. These burrows are sometimes very deep, and hills of loose earth are generally found over them. Sometimes one of these creatures shows his head from the centre of one of the hills at mid-day, for the purpose of enjoying the sunshine. They form galleries under ground, by which they can travel in any direction. It is said that they come to the top of the ground daily at twelve o'clock.

The favourite food of the Shrew Mole is the earthworm, though they destroy great numbers of grubs and insects. They are exceedingly attached to a long frequented burrow, and when it is injured, will repair it in a short ime; and continue to do so, as often as it is destroyed, with the utmost patience.

This animal is covered with a soft glossy fur; its head is destitute of external ears, though its sense of hearing is very acute. The eyes are so small as scarcely to be pereived. It has great strength and speed, even on the sur-

face of the earth, its movement being the same as when burrowing.

THE STAR-NOSE MOLE burrows on the banks of rivulets and in the soft soil of meadows. The form of the burrows resembles that of the shrew mole, but they are found in different situations; as the Star-nose prefers moist and low places, and the shrew mole is found in dry and elevated spots.

The distinguishing peculiarity of this mole is a remarkable disk, or fringe, that surrounds the nostrils. This has about twenty points, of a rose color, and free from hair. It is from this circumstance that it derives its name. Its food is of the same kind as that of the shrew mole, and it forms hills of earth over its burrows in the same manner.

THE HEDGEHOG,

THE length of which varies from six to ten inches, has the power of defending itself from an enemy without combating him, and of annoying without attacking him. Possessed of little strength, and of no agility by which it might escape its foes, it has received from nature a prickly armour, with a facility of rolling itself up in a ball, and of presenting from every part of its body a poignant weapon of defence. Even from its fear this animal obtains another engine of security; the smell of its urine,

which, when attacked, it generally sheds, being sufficient to disgust its enemy with the contest, and to keep him at a distance. Thus the generality of dogs are content with barking at the Hedgehog, when it falls in their way, without discovering any inclination to seize it. Of these, however, there are some which, like the fox, have had the address to master it, though of the martin, the polecat, the ferret, the weasel, or any of the birds of prey, it has no dread.

When at large in the country, they are generally found in woods, under the trunks of old trees, as also in the clefts of rocks. I do not believe that they climb up trees, as some naturalists have affirmed, or that they make use of their prickles to carry off the fruit; it is with their mouth they seize it; and though they are very numerous in European forests, yet I have never seen one of them upon a tree. They always remain at the foot, in some hollow space, or under moss. They remain in a state of inactivity all day; they only venture abroad by night, and seldom approach human habitations. They sleep during the winter; and therefore every thing that has been said of their laying up provisions for that season, must be false. They at no time eat much, and can subsist very long without any food whatever. Hedgehogs are occasionally eaten, and their flesh is said to be delicate food; their skin is not any longer converted to the smallest use, though the ancients used it for the purpose of a clothes brush.

The Hedgehog may be rendered domestic, and in that state is very useful in destroying cockroaches and beetles, which he pursues and devours with great activity. He is believed also to destroy mice, nearly if not quite as well as a cat. A Hedgehog belonging to the proprietor of an inn at Felton, in Northumberland, Eng. was taught to perform perfectly the duty of a turnspit dog. It ran familiarly round the house, and was very obedient.

"In the month of June, 1782," says a coreespondent in the Gentleman's Magazine, "a full grown Hedgehog was put into a small yard, in which was a border of shrubs and annuals. In the course of a few days he formed, beneath a small holly tree, a hole in the earth sufficiently large to receive his body. After a while a small shed was built for him in the corner of the yard, and filled with straw; but the animal would not quit its former situation until it was covered with a stone. He then took possession of the shed, and every morning carried leaves from a distant part of the border, to stop its mouth. His principal food was raw meat and mice. Of the latter he would eat six at a time, but never more; and although these were thrown to him dead, he bit them all in the neck before he began to eat any. He would also eat snails with their shells; but would leave any thing for milk, which he lapped exceedingly slow. To this, even if set six or eight yards distant from his shed, he would almost always come out half an hour before his usual time. If the person who usually fed him neglected to do so, he would follow him along the yard; and if the door was open, he would go into the house. If meat was put near the mouth of his shed in the daytime, he would sometimes pull it in and eat it. As the weather became colder, he carried more leaves into his shed; and sometimes he would not come out for two or three days successively. About the end of November he died; from want of food, as was supposed, but most probably from the severity of the weather."

THE MARMOT,

When taken young, is more capable of being tamed than any other wild animal, and nearly as much so as the domestic ones. It will easily learn to perform feats with a

stick, to dance, and in every thing to obey the voice of its master. It has a great antipathy to the dog; and when it becomes familiar in a house, and is sure of being supported by its master, it will, in his presence, attack the largest dogs, and boldly fasten upon them with its teeth. Though this creature is not quite so large as a hare, it is yet of a more squat make, and has great strength joined to great agility. It has four teeth in the front of the jaw, which are long and strong enough to inflict a terrible wound; and yet, unless provoked to it, it neither attacks dogs, nor does mischief to any creature whatever. If care be not taken, however, it will gnaw the furniture of a house, and will even make holes through wooden partitions.

As the Marmot has very short thighs, and the toes of its paws are formed like those of the bear, so it often sits erect, and walks with ease, like that animal, upon its hind feet. With its fore paws it carries its food to its mouth, and eats in an upright posture like the squirrel. It runs much swifter up hill than down; it climbs trees, and runs up the clefts of rocks, or the contiguous walls of houses, with much facility; so much so, indeed, that it is ludicrously observed of the Savoyards, who are the general chimney-sweepers of Paris, that they have learned their trade from the Marmot.

These animals eat indiscriminately of whatever is given them, whether it be flesh, bread, fruits, herbs, roots, pulse, or insects. Of milk and butter, however, they are particularly fond; and, though less inclined to petty thefts than the cat, they are yet never better pleased than when they obtain access to the dairy.

There seems to be a combination of the bear and the rat in the form of the Marmot. Its nose, its lips, and the form of its head, are like those of the hare; it has the hair and claws of the badger, and teeth of the beaver, the whiskers of the cat, the paws of the hare, with a tufted tail and short ears. The colour of its hair on the back is reddish brown. On the belly it is reddish, but softer and shorter. Its voice resembles that of a little dog, when it is played with or caressed; but when it is irritated or frightened, it raises a loud and shrill cry, highly offensive to the ear. The Marmot is a very cleanly animal. In autumn particularly it is loaded with fat, though all the parts of the body are never equally so. The Marmot would be tolerable food, did it not constantly retain somewhat of a disagreeable smell.

This animal, which delights in the regions of ice and snow, and is never found but on the highest mountains, is, nevertheless, most liable to be benumbed by the cold. From the end of September, or the beginning of October, the Marmot generally retires to its hole, and appears not again till about the beginning of April. The place of its retreat is formed with precaution, and finished with art. It is rather wide than long, and very deep, so that it is capable of containing several, without being under a necessity of crowding each other, or injuring the air they breathe. Their feet and claws are formed as if they were designed to dig; and, in fact, they burrow into the ground with amazing celerity, scraping up the earth, and throwing back what they have loosened behind them constantly as they proceed. Still more wonderful is the form of their hole; it resembles the letter Y, the two branches having each an opening that conducts into one channel, which terminates in their general apartment at the bottom. As the whole is contrived on the declivity of a mountain, there is no part of it on a level but the apartment at the end. One of the branches, or openings, issues out sloping downward; and this serves as a kind of sink, or drain, for the whole family, in which they void their excrements, and through which the moisture of the place finds an easy passage. The other branch, on the contrary, slopes upward, and serves them as a door to go in and out. The apartment at the end is warmly lined with moss and hay. It is even assserted, that this is a public work; that some cut the finest grass, others pile it up, and others take their turns to convey it to the hole. Upon this occasion, it is added, one of them lies upon its back, permits the hay to be heaped upon its belly, keeps its paws upright to make greater room, and in this manner, remaining still upon its back, is dragged by the tail, hay and all, to their common retreat. This practice some assign as a reason for the hair being generally worn away from their backs. However, another and perhaps a better reason may be given for this appearance; namely, their inhabiting cells under ground, and being constantly employed in digging up the earth. Whenever they venture abroad, one is placed as a sentinel, sitting on an elevated rock, while the others amuse themselves in the fields below, or are employed in cutting grass, and making it into hay for their future convenience; and no sooner does their trusty sentinel perceive a man, an eagle, a dog, or any other enemy, than he gives notice to the rest by a kind of whistle, and is himself the ast that takes refuge in the cell.

They make no provision for the winter, foreseeing probbly that such a precaution would be useless. But when hey perceive the first approaches of the season in which heir vital motions are to continue in some measure susended, they labour very diligently to close up the aperures of their dwellings, which they effect with such soliity, that it is more easy to open the earth any where else, han where they have closed it. They are at that time ery fat, and some of them are found to weigh twenty pounds. In this plight they continue for three months longer; but by degrees their flesh begins to waste, and they are quite thin by the end of winter. When their retreat is discovered, they are found each rolled into a ball, and covered with hay. In this state they seem entirely lifeless: they may be taken away, and even killed, without their testifying any sense of pain; and those who find them in this manner carry home the fat ones for food, and the young ones for breeding up and taming. The Marmot produces but once a year, and the litter generally consists of three or four. Their growth is quick, and they live only nine or ten years. They are found in the Alps, Apennines, Pyrenees, in the highest mountains of Germany, in Poland, and in America, with some variations.

THE MARYLAND MARMOT, OR WOODCHUCK.

This animal is common in all the temperate parts of America. It does great injury to the farmers, as the quantity of herbage it consumes is really surprising. It burrows in the ground on the sides of hills, and these extend to great distances under ground, and terminate in various chambers. Here the Marmot makes himself a comfortable bed of dry leaves, grass, and any soft rubbish, where he sleeps from the close of day, till the next morning is far advanced.

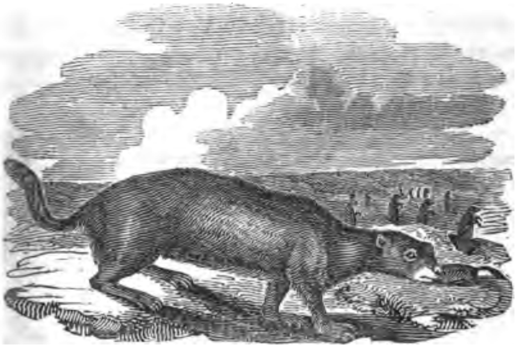
The Maryland Marmot eats with great greediness, and in large quantities. It is fond of cabbage, lettuce, and other garden vegetables. When in captivity, it is exceedingly fond of bread and milk.

At the commencement of cold weather, the Marmot goes into winter quarters, blocks up the door within, and remains torpid till the warm season. It is about the size of a rabbit, and of a dark brown colour.

QUEBEC MARMOT.

This animal is found in the northern parts of America, and resembles the Maryland Marmot in its habits. It is of a grey colour.

PRAIRIE MARMOT, OR WISHTONWISH.



This animal commonly called Prairie Dog, builds his dwelling in the barren tracts of the western country, and may often be seen sitting by the small mounds of earth, which indicate his abode, in an attitude of profound attention. Whole acres of land are occupied by these little tenants, and villages are found, containing thousands of inhabitants. Near the Rocky Mountains these villages are found to reach several miles. The burrow extends under ground, but to what distance has not been determined.

This Marmot, like the rest of the species, remains torpid during the winter. It is very much annoyed in its habitation by owls, rattle-snakes, lizards, and land tortoises, who appropriate these comfortable dwellings for their own use, and frequently destroy the young Marmots.

FRANKLIN'S MARMOT.

THIS animal is about the size of a rabbit, and is of a gray colour. It was first seen by Capt. Franklin near Fort Enterprise, in the British possessions in North America.

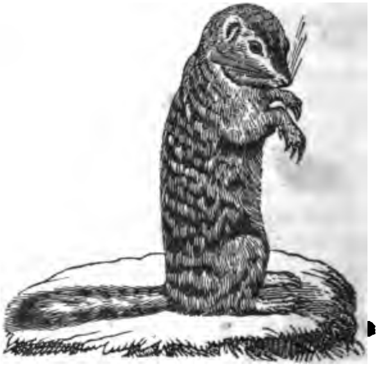
RICHARDSON'S MARMOT.

THIS animal, sometimes called the TAWNY AMERICAN MARMOT, was found in the Hudson's Bay country by Franklin's expedition. It is nearly the size of the preceding species.

HOOD'S MARMOT.

THIS beautiful Marmot is found in the northern and western parts of America, and bears a strong resemblance to the striped squirrel, being marked with similar lines.

PARRY'S MARMOT.



THIS animal was named in honour of Captain Parry, and was found in the expedition under Captain Franklin. It is rather larger than Franklin's Marmot, has a broad flat body, and thick legs.

HOARY MARMOT, OR WHISTLER.

THIS animal inhabits the Rocky Mountains. It burrows in sandy soil, and may frequently be seen cutting hay, either for food or for its nest. While a party of them are employed in this way, if they are disturbed, the sentinel who sits near on an eminence, gives the alarm by a shrill whistle, which may be heard at a great distance, and is repeated from one Marmot to the other as far as their burrows extend.

The whistler feeds on roots and herbs, and is said to be about the size of a badger, and covered with silver-gray hair. The Indians take them in traps, and consider their flesh delicious food. They use their skins sewed together as blankets.

SHORT TAILED MARMOT.

THESE animals are found on the plains of the Columbia, and form burrows in immense numbers, sometimes covering two hundred acres of land. Each burrow contains ten or twelve inhabitants. They feed on the roots of grass.

THE AMERICAN SOUSLIK.

THIS animal resembles Parry's Marmot very closely in colour: its habits are not well known. It is found on the Rocky Mountains.

BEECHEY'S MARMOT.

THIS animal resembles Franklin's Marmot in colour, size and appearance. It is found in California, where it burrows in sandy plains in great numbers. Troops of them are often seen in fine weather, frolicking or feeding near their habitations, to which they run on the slightest alarm. On looking around, they frequently stand on their hind legs. When the weather is rainy, they do not appear above ground. They are very cleanly in their habits.

DOUGLAS' MARMOT.

This species is found on the banks of the Columbia River, and resembles the preceding in appearance. Little is known of its habits.

SAY'S MARMOT.

This animal was first seen by Lewis and Clark, and is ranked among the squirrels by Godman, under the name of the Rocky Mountain ground squirrel. Richardson classes it among the Marmots. Its back is striped with brown and white lines. It burrows in the ground, and is very abundant in the Rocky Mountains.

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